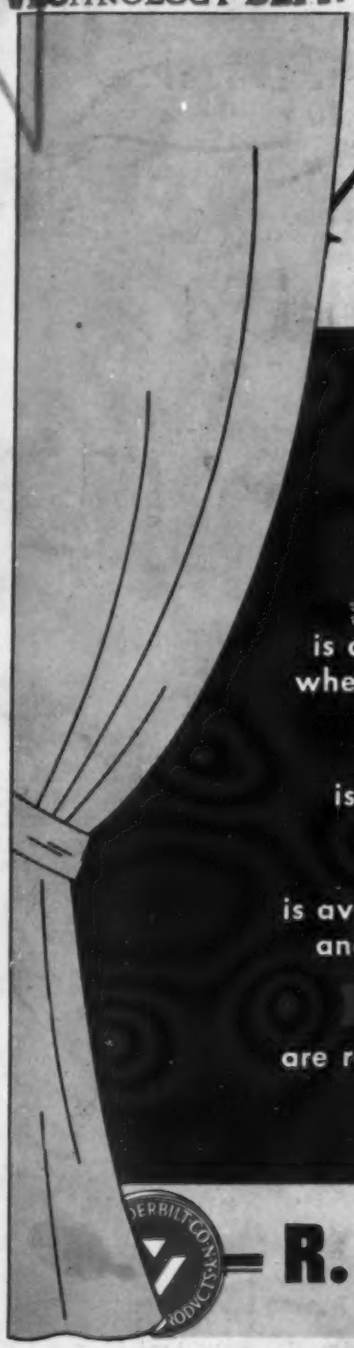
The RUBBER AGE

September, 1945

TECHNOLOGY DEPT. OCT 3 1945



Available

KALVAN

is available for use in highest quality non-black goods.

KALITE

is available for medium and low quality goods where smooth calendering and tubing is required.

CUMATE

is available for fastest curing of GR-S stocks.

RIO RESIN

is available for better aging and resistance to light and ozone for both GR-S and Neoprene stocks.

P-33 and THERMAX

are readily available for all requirements. They are useful in a lot of civilian goods.

R. T. VANDERBILT CO., INC.

230 Park Avenue, New York 17, N. Y.

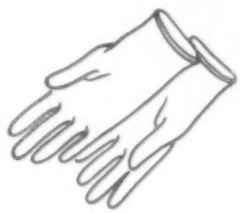
Newsletter No. 9
SEPTEMBER, 1945

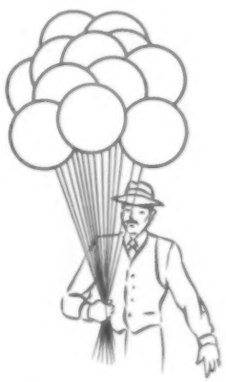
Published by Rubber Chemicals Division of DUPONT

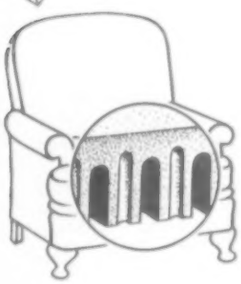
NEOPRENE LATEX

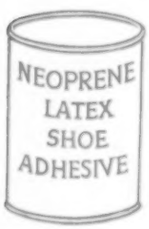
HAS NEVER COST SO LITTLE AS NOW!

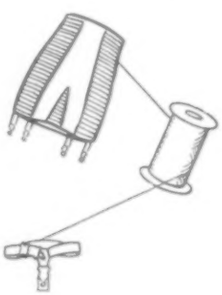
Why not review your plans for the sale of latex products with greater emphasis on neoprene latex?











Many manufacturers have found that they can make practically any latex product from neoprene latex. They have found also that these articles can be made without extensive alteration of established processes and that the articles themselves are superior for the intended uses to the rubber products previously made.

The value of neoprene latex to the latex industry has been demonstrated under difficult conditions during the war emergency. It will prove equally valuable in the manufacture of the industry's peacetime products. The recent price reduction means a great improvement in the economic picture for postwar articles.

There is plenty of neoprene latex available. Shipments are made promptly in tank cars, drum carloads and trucks.

Commercial Neoprene Latices:

Type 571—50% solids—for general purpose use.

Type 572—50% solids—for fast setting adhesives.

Type 571 Conc. and Type 60—59% solids—for foam sponge, dipped goods and other items requiring high solids.

Outstanding Properties:

Resistance to

Flame	Chemicals
Sunlight	Oxidation
Oils	

Low Prices:

Tank cars of Type 571 at 25c per lb. See our new Neoprene Latex Price Schedule.

Literature:

Know-how on the use of neoprene latex for many applications is available. Tell us your problem and let us send you our bulletins which apply. Ask for our new report BL-201, "The Neoprene Latices."

BUY AND HOLD VICTORY BONDS

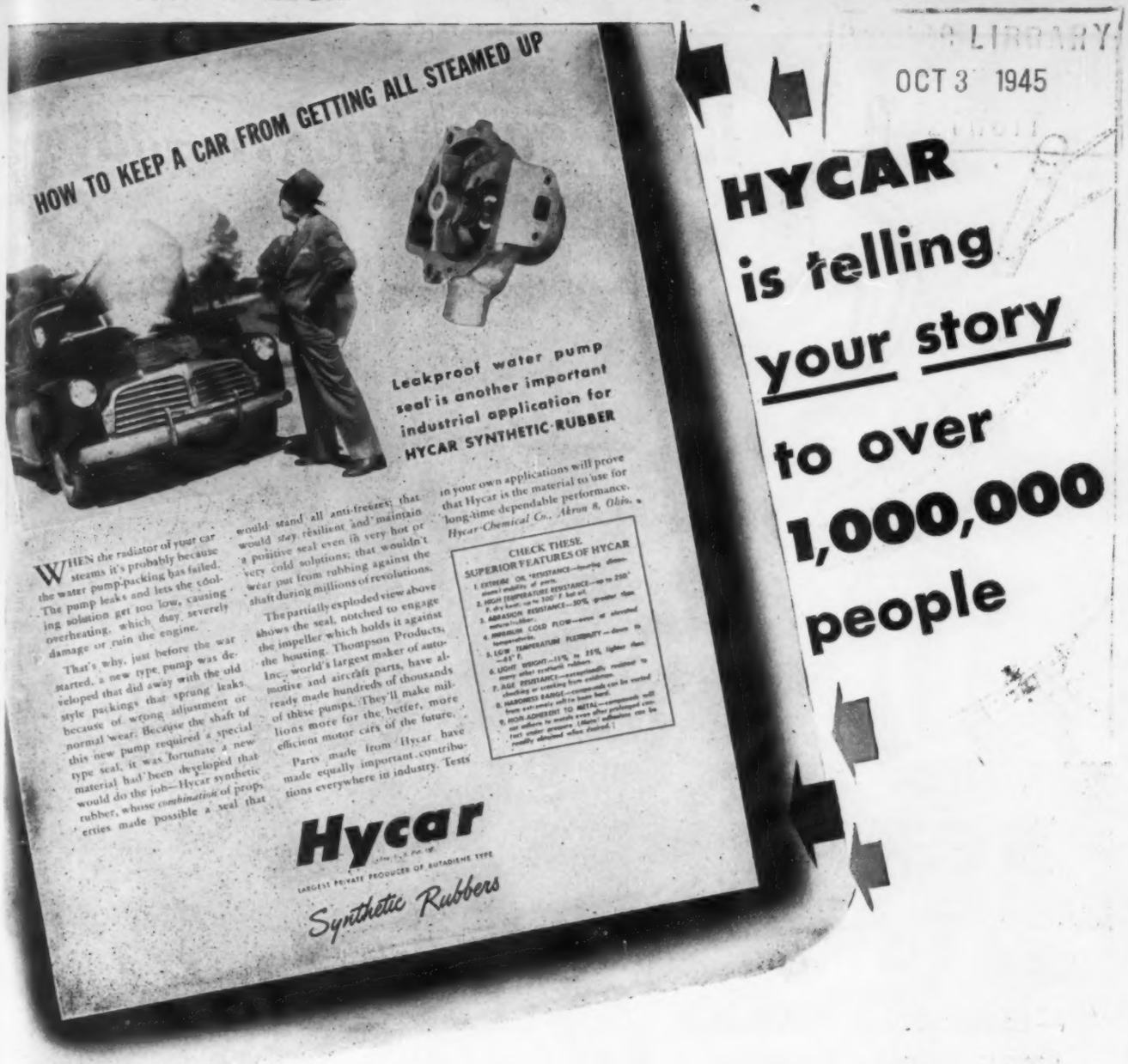
DUPONT

RUBBER CHEMICALS DIVISION

BETTER THINGS FOR BETTER LIVING . . . *Through Chemistry*

THE RUBBER AGE, published monthly by The Palmerton Publishing Co., Inc., Printing Office, East Stroudsburg, Pa. Editorial and Advertising Offices at 250 West 57th Street, New York 19, N. Y. Entered as second class matter October 20, 1933, at the Post Office at East Stroudsburg, Pa., under the Act of March 3, 1879. Subscription in United States, $3.00 a year; Canada, $3.50; Foreign, $4.00. September, 1945, Vol. 57, No. 6.

LIBRARY
OCT 3 1945


HOW TO KEEP A CAR FROM GETTING ALL STEAMED UP
Leakproof water pump seal is another important industrial application for HYCAR SYNTHETIC RUBBER
WHEN the radiator of your car steams it's probably because the water pump-packing has failed. The pump leaks and lets the cooling solution get too low, causing overheating, which may severely damage or ruin the engine.
That's why, just before the war started, a new type pump was developed that did away with the old style packings that sprung leaks because of wrong adjustment or normal wear. Because the shaft of this new pump required a special type seal, it was fortunate a new material had been developed that would do the job—Hycar synthetic rubber, whose combination of properties made possible a seal that would stand all anti-freezes; that would stay resilient and maintain a positive seal even in very hot or very cold solutions; that wouldn't wear out from rubbing against the shaft during millions of revolutions.
The partially exploded view above shows the seal, notched to engage the impeller which holds it against the housing. Thompson Products, Inc., world's largest maker of automotive and aircraft parts, have already made hundreds of thousands of these pumps. They'll make millions more for the better, more efficient motor cars of the future.
Parts made from Hycar have made equally important contributions everywhere in industry. Tests in your own applications will prove that Hycar is the material to use for long-time dependable performance.
Hycar Chemical Co., Akron 8, Ohio.
CHECK THESE SUPERIOR FEATURES OF HYCAR
Hycar
LARGEST PRIVATE PRODUCER OF BUTADIENE TYPE
Synthetic Rubbers
HYCAR is telling your story to over 1,000,000 people

HERE'S a HYCAR advertisement that is appearing in business and industrial magazines with a combined circulation of 1,026,000 readers. Not all of these readers are prospects, of course. But many of them are—in already established fields, and in fields that you and we may not even know exist.

In magazines like Newsweek, Business Week, and United States News we're seeking the big, broad, unknown audience—*for you.* In automotive, aviation, design, and petroleum publications we're continuing to tell your story to people that we are certain should hear it.

Except for offering you synthetic rubber of the highest quality and uniformity plus the finest technical service, this is as far as we can go. We make no finished products—just the raw Hycar synthetic rubber.

Our advertising is intended to promote the sale of HYCAR by making it easier for you to sell *high-quality* rubber products and by stimulating *new uses* for synthetic rubber in applications formerly made from other materials. Your part is to take advantage of these opportunities for *better* sales in established markets and for *additional* sales in entirely new fields.

Reprints of all Hycar advertisements are available to you without cost. Just send your request to *Hycar Chemical Company, Akron 8, Ohio.*

Hycar

Reg. U. S. Pat. Off.

LARGEST PRIVATE PRODUCER OF BUTADIENE TYPE

Synthetic Rubbers

NOW YOU CAN DO IT

—because Philblack A is available in greater quantity through new plant facilities. Shorter mixing time due to much faster complete incorporation. Less break down of rubber to obtain higher quality products. Low heat build up with good abrasion and excellent physical properties at high operating temperatures.

Those are some of the very good reasons why many manufacturers of tires, tubes, and other rubber goods are now using Philblack A. And that's the reason why we've had to increase our production by *16 million pounds!* If you have not been able to get Philblack A before, you can get it now, because we've stepped up our output to meet the urgent demand for this wonder-working black.

PHILLIPS PETROLEUM COMPANY

Philblack *Division*

FIRST CENTRAL TOWER BUILDING · AKRON, OHIO

WATER WINGS FOR A FLYING LIFEBOAT

Sails and all other fabric parts of rescue craft are protected by light-weight coatings of GEON

WHEN one of the newly developed Higgins airborne lifeboats parachutes to the aid of downed fliers, a lot of GEON polyvinyl resin in the form of fabric coatings drops with it. Sails, sail covers, tarpaulins, water catchers—all are made from a GEON-coated fabric ("Duroduck", by Hudgins & Ratsey). Even the parachute packs and instrument cases are coated with this life-lengthening material.

That's because coatings of GEON offer such high resistance to normally destructive factors. For example, in the South Pacific area, an untreated fabric may be attacked by mildew and fall to pieces overnight. But mildew has no harmful effect on a coating of GEON. Nor does GEON suffer from the effects of sunlight, air, heat, cold, salt water, abrasion—all of which are present in this unusual service.

In other fields, GEON may be made into products that resist oils, acids, foods, creasing, and flame. GEON raw materials may become a transparent packaging material that can be heat-sealed—or scuffproof luggage that will wear indefinitely—or shoe soles and heels that will last as long as the uppers—or upholstery material that can be left outdoors because it resists the action of sun and rain. All products of GEON may be delicately or brilliantly colored. There will be uses for products made from GEON in every industry. For more information please write Department KK-9, B. F. Goodrich Chemical Company, Rose Bldg., Cleveland 15, Ohio.

Geon
Polyvinyl Materials

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

A place for everything . . and everything in its place

THAT'S Philadelphia reclaimed rubber being loaded into that freight car.

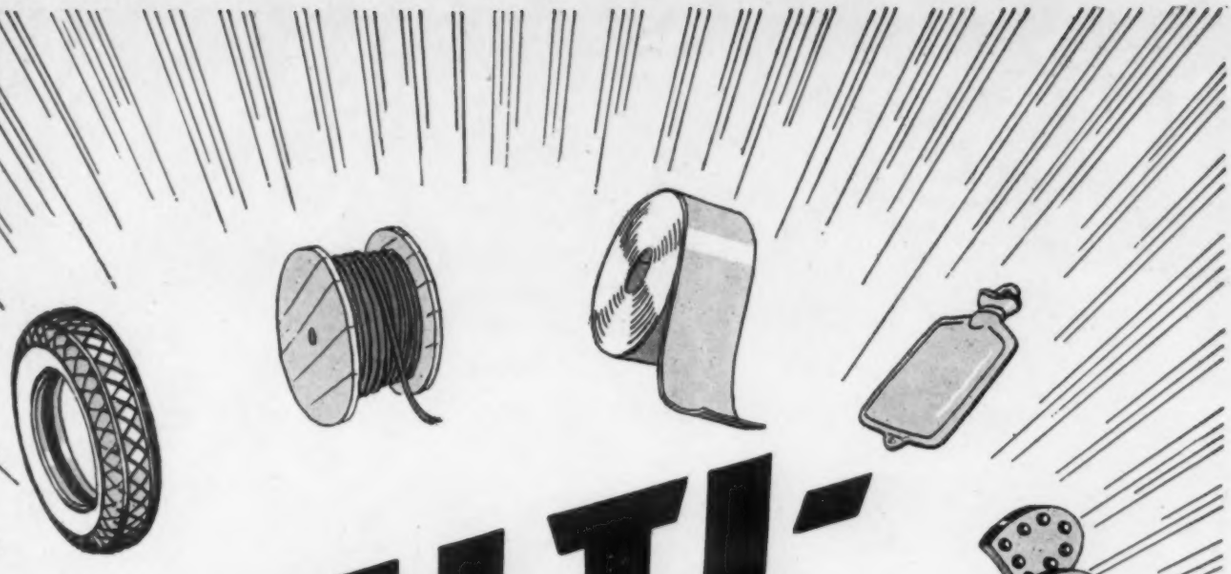
Soon, on other loading platforms, it will be natural rubber — *and* synthetic rubber — *and reclaimed* rubber of all types.

That's because there's going to be a variety of uses for *all* these materials when normal times return.

Meanwhile, Philadelphia reclaim continues to occupy an important position in the rubber industry. First, it's a *stable* compounding material that makes possible lower cost of finished products. Second, Philadelphia Rubber's knowledge and experience—increased by the accelerated research brought on by the war—have been equaled by no others in the fields of both natural and synthetic reclaimed rubber.

So, continue to include Philadelphia reclaimed rubber in your present and future plans. And if you need help in finding the answer to any compounding or processing problem involving natural or synthetic reclaimed rubber, please write The Philadelphia Rubber Works Company, Rose Building, Cleveland 15, Ohio.

PHILADELPHIA
RECLAIMED RUBBER



MULTI-PLAST

for MULTI-PURPOSE COMPOUNDING

MULTI-PLAST, a high quality plasticizer of the sulfur-reactive type, is now being used for all types of compounding in the production of a variety of rubber goods. Its wide acceptance has proven that it can do a good job at low cost. If you have a processing or compounding problem, MULTI-PLAST may be the answer.

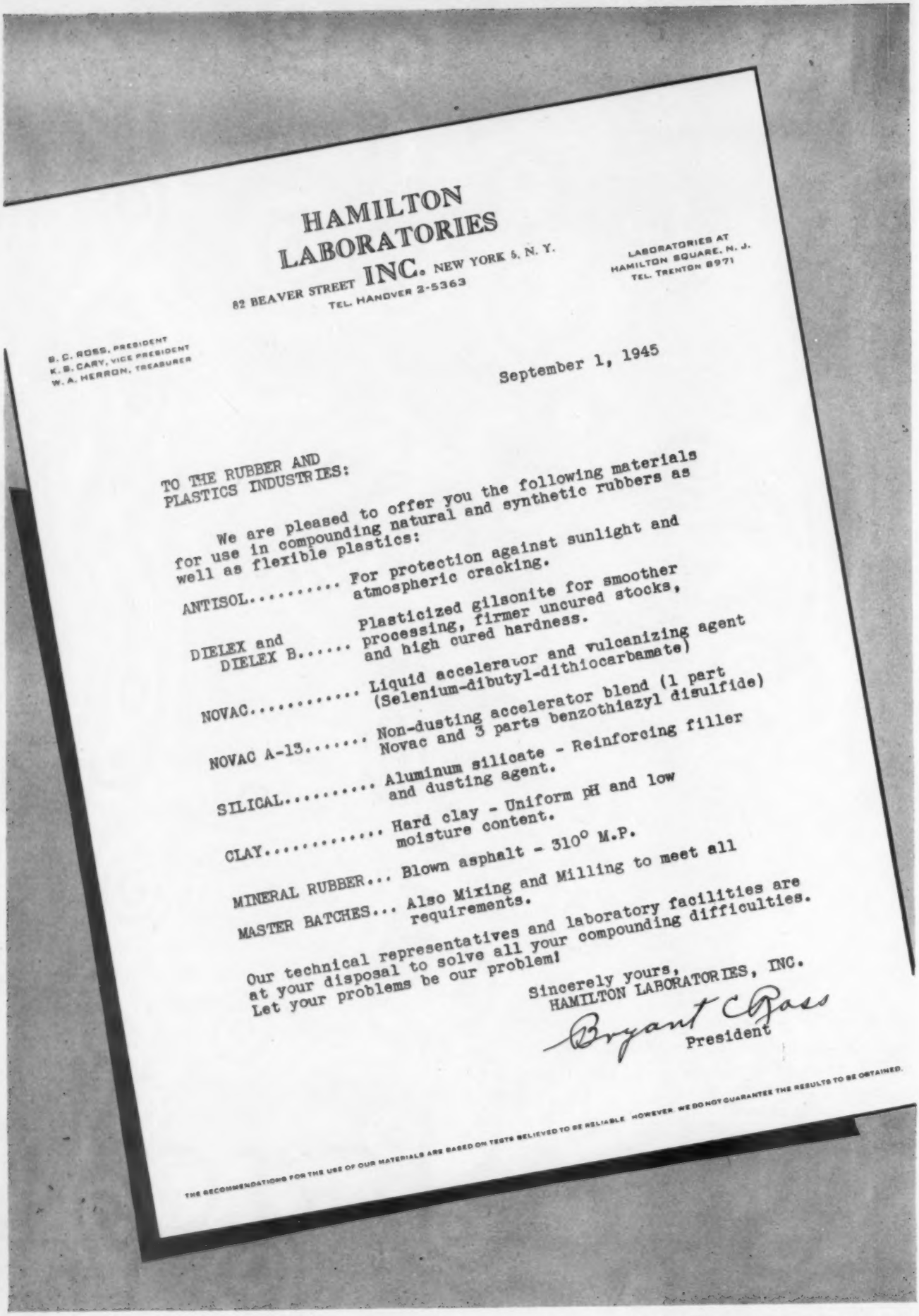
W
C=C

REG. U. S. PAT. OFFICE

WILMINGTON

CHEMICAL CORPORATION

10 EAST 40TH STREET • NEW YORK 16, N. Y.



HAMILTON LABORATORIES INC.

82 BEAVER STREET NEW YORK 5, N. Y.
TEL. HANOVER 2-5363

LABORATORIES AT
HAMILTON SQUARE, N. J.
TEL. TRENTON 8971

B. C. ROSS, PRESIDENT
K. B. CARY, VICE PRESIDENT
W. A. HERRON, TREASURER

September 1, 1945

TO THE RUBBER AND
PLASTICS INDUSTRIES:

We are pleased to offer you the following materials for use in compounding natural and synthetic rubbers as well as flexible plastics:

ANTISOL..... For protection against sunlight and atmospheric cracking.

DIELEX and DIELEX B..... Plasticized gilsonite for smoother processing, firmer uncured stocks, and high cured hardness.

NOVAC..... Liquid accelerator and vulcanizing agent (Selenium-dibutyl-dithiocarbamate)

NOVAC A-13..... Non-dusting accelerator blend (1 part Novac and 3 parts benzothiazyl disulfide)

SILICAL..... Aluminum silicate - Reinforcing filler and dusting agent.

CLAY..... Hard clay - Uniform pH and low moisture content.

MINERAL RUBBER... Blown asphalt - 310° M.P.

MASTER BATCHES... Also Mixing and Milling to meet all requirements.

Our technical representatives and laboratory facilities are at your disposal to solve all your compounding difficulties. Let your problems be our problem!

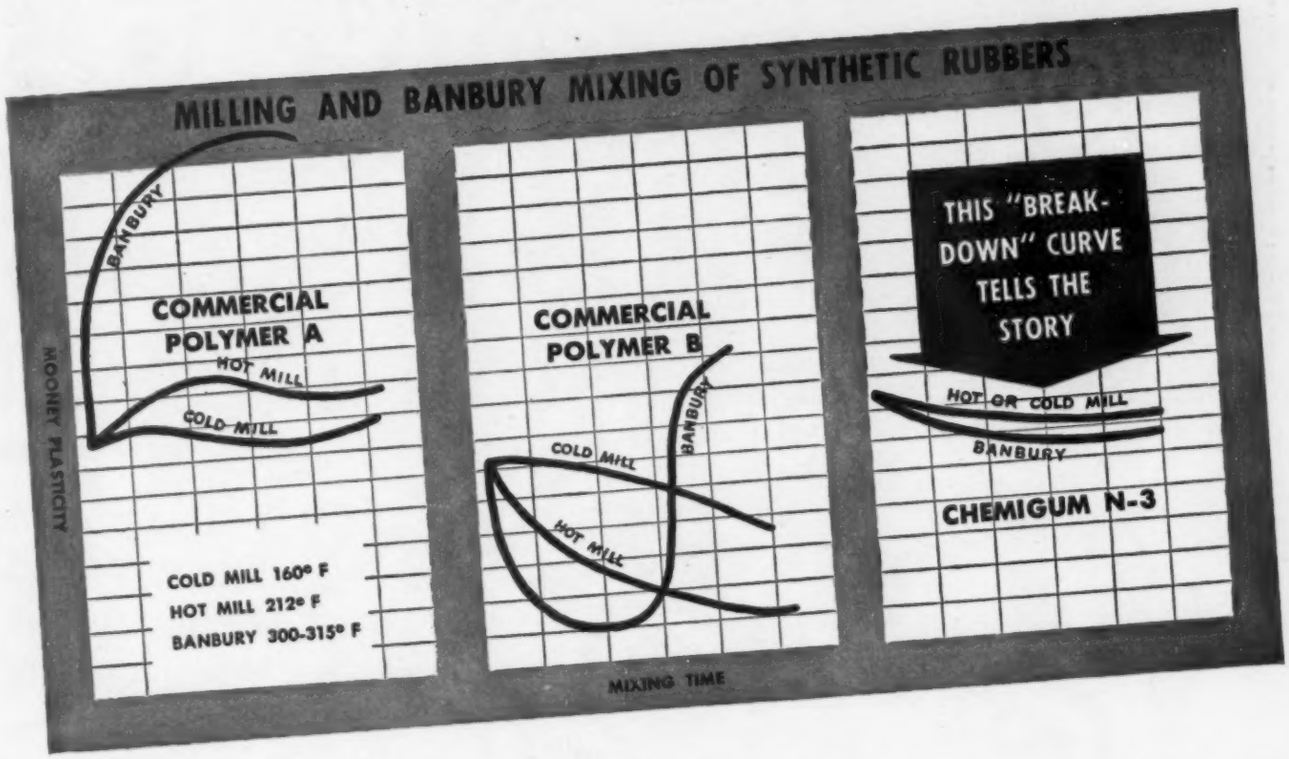
Sincerely yours,
HAMILTON LABORATORIES, INC.
Bryant C. Ross
President

THE RECOMMENDATIONS FOR THE USE OF OUR MATERIALS ARE BASED ON TESTS BELIEVED TO BE RELIABLE. HOWEVER WE DO NOT GUARANTEE THE RESULTS TO BE OBTAINED.

Announcing

CHEMIGUM N-3

—the easy processing synthetic rubber



Now Goodyear Research brings you a new type of synthetic rubber — Chemigum N-3. Its outstanding characteristic, in comparison with other rubbers now available, is greater ease of processing either by mill or Banbury, as the chart above shows. It breaks down uniformly and is *heat stable*.

In addition, Chemigum N-3 offers the following important advantages:

LOW SOLVENT SWELL
GOOD HEAT AGING
LOW COMPRESSION SET
UNIFORMITY

You will find Chemigum N-3 excellent for all compounds requiring a Buna-N type oil-resistant synthetic base. It is now in volume production. For sample and full information, write: Goodyear, Chemical Products Division, Plastics and Coatings Dept., Akron 16, Ohio.

Chemigum (pronounced Kem-e-gum)—
T. M. The Goodyear Tire & Rubber Company

GOODYEAR

THE GREATEST NAME IN RUBBER

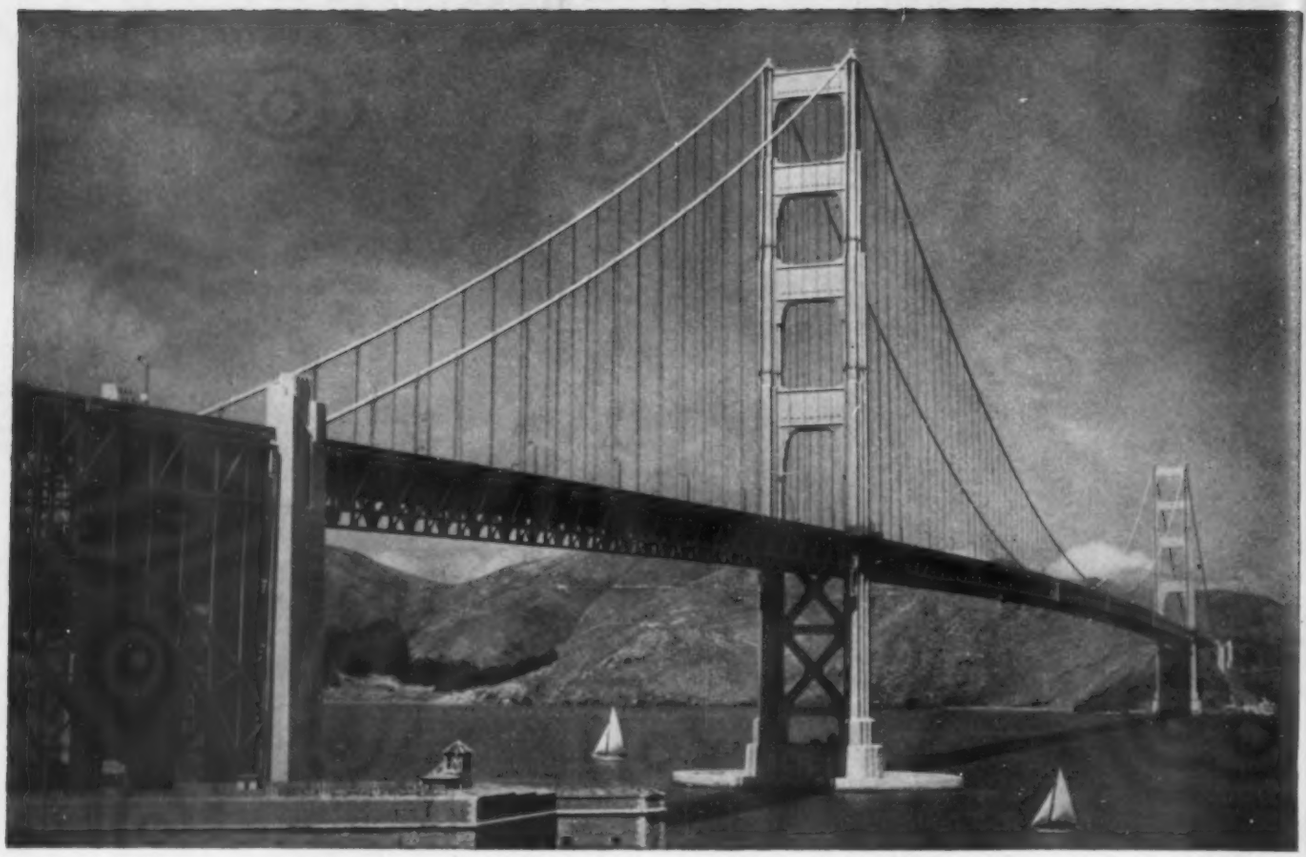


Photo Courtesy Californians, Inc.

BRIDGES OF EXPERIENCE

The engineer who builds a bridge relies on his experience—and the best materials. If the smallest portion of any material be defective the success and safety of the whole bridge is threatened.

So it is with rubber compounds. That's why most rubber engineers specify GASTEX and PELLETEX, the original, the pioneer, the leading semi - reenforcing furnace black.

Due to recent extensive additions to production facilities, stocks of these most popular blacks are now available.

GENERAL ATLAS CARBON CO.

PELLETEX

GASTEX

MANUFACTURER

Pampa, Texas

Guymon, Okla.

HERRON BROS. and MEYER

DISTRIBUTOR

New York, N. Y.

Akron, Ohio

RUBBER H AND M PIGMENTS Chemicals

LATEX: raw — uncompounded
natural or synthetic

NAUGATEX: compounding materials for latex and dispersions

LOTOL: compounded latex
natural or synthetic

KOTOL: protective coatings
temporary or permanent

manufacturers' supplies — saturating — coating — bonding — dipping

NAUGATUCK CHEMICAL

Division of United States Rubber Company

ROCKEFELLER CENTER, 1230 SIXTH AVENUE · NEW YORK 20, N. Y. · BRANCHES: AKRON — BOSTON — DETROIT

The C. P. Hall Co.
CHEMICAL MANUFACTURERS

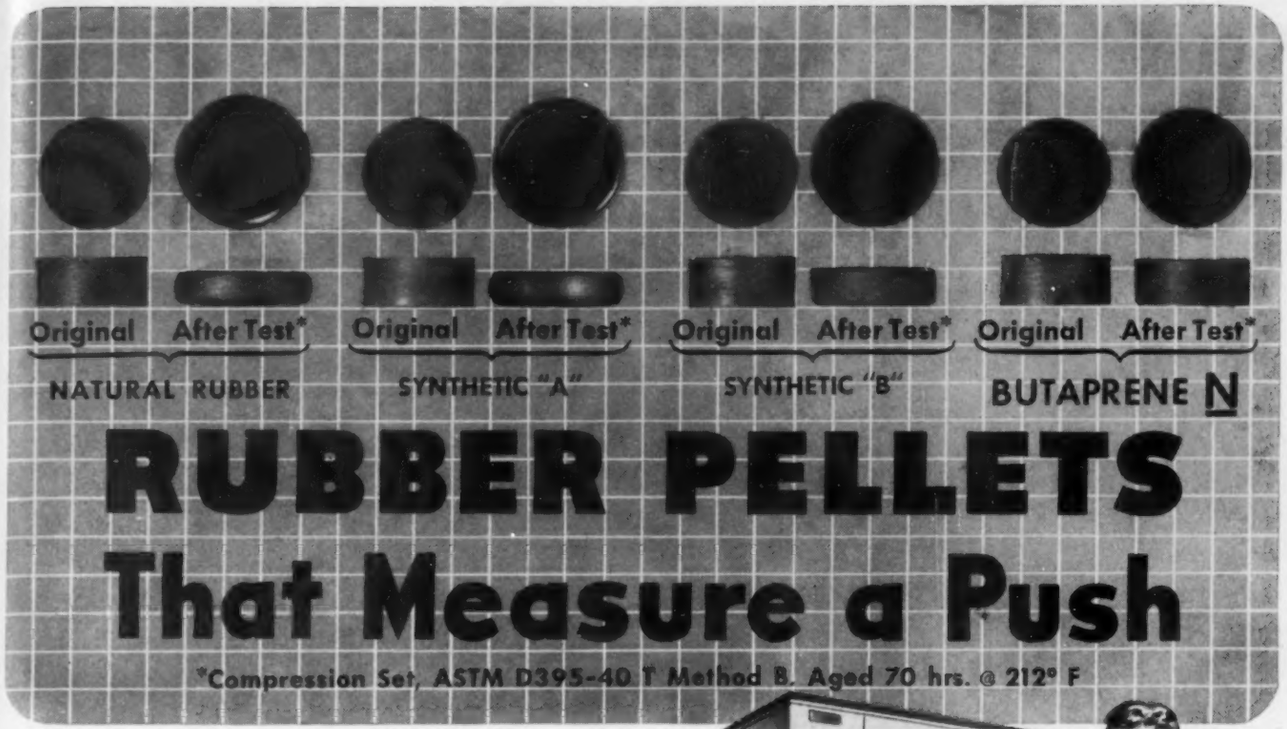
ACCELERATORS

PLASTICIZERS

ANTIOXIDANTS

A Complete Line of Approved Compounding Materials

AKRON, OHIO • LOS ANGELES, CALIF. • CHICAGO, ILL.



RUBBER PELLETS That Measure a Push

*Compression Set, ASTM D395-40 T Method B. Aged 70 hrs. @ 212° F

THE PUSH in rubber under compression is one of its most vital physical properties. Without it, gaskets no longer seal, pump washers can't hold a vacuum, motor mountings lose vitality. All compounded rubbers lose some of their push with age; *compression set*, the rubber chemists call it.

But how about compression set in these new synthetic rubbers? The flattened pellets in the picture tell the story. They all started out the same, were aged at the same pressure for the same length of time. Then the pressure was released. Notice the compression set of natural rubber and the two synthetics — flat, squashed, lifeless; little, if any, push left. Then look at Butaprene-N, back practically to its original form, retaining practically all of its original push — compression set not much more than 10%.

Low compression set is only one of the many important properties of the Butaprene-N polymers. For complete chart showing all the physical properties of the Butaprene-N synthetics write XYLOS RUBBER COMPANY, Akron, Ohio.

BUTAPRENE N by Firestone

THE SYNTHETIC RUBBER OF A THOUSAND POSTWAR USES

RESISTS: OIL · GASOLINE · HEAT · SUB-ZERO COLD · AGING · ABRASION

Copyright, 1945, The Firestone Tire & Rubber Co.

Technical Bulletin No. 14 — on the Compounding of GR-S with Substantial Loadings of Zinc Oxide

100 Parts of Zinc Oxide with GR-S-10 (Rosin Soap Polymer)

ORIGINAL RESULTS

Time of Cure Min. at 45 Lb.	Tensile Strength (psi)	Per Cent Elongation	Modulus Load (psi) for Elongation of:				Permanent Set	Shore Hardness	Tear Resistance Tested at:	
			200%	300%	400%	500%			Room Temp.	100°C.
									Lbs./In.	
15	1270	910	155	230	310	425	.29	37	104	46
30	1655	815	190	310	425	615	.26	41	101	64
45	1450	675	230	380	570	800	.20	42	91	55
60	1420	645	230	385	615	845	.19	43	87	44
90	1500	600	310	500	690	960	.17	45	76	40
120	1220	545	265	455	685	990	.10	45	75	35

Time of Cure Min. at 45 Lb.	Goodyear-Healey Pendulum		Compression Fatigue (Goodrich Flexometer)*					Cut-Growth Resistance Inches—Failure at	
			Per Cent Initial Comp.	Running Time and Per Cent Permanent Set	Max. Temp. Rise °C.	Dynamic Compression			
	Indentation in mm.	Per Cent Rebound				Initial	Final	2,000 Cyc.	11,000 Cyc.
120	8.28	55.7	25.8	15'—2.8	19.7	16.7	17.2	.09	.63

*Test Conditions: 100 Lb. Load. 0.15" Stroke. 100°C. Oven Temp.

"SPDX-G" Acceleration

(Refer to Technical Bulletins No. 9, 10, 11, and 13)

GR-S-10 continues to show good results with Zinc Oxide in compounds with a variety of accelerators. "SPDX-G" gives good stress-strain properties, with comparatively low set and better tear resistance than most compounds with regular GR-S. The heat generation and cut-growth results are quite satisfactory.

COMPOUND No. 14	
GR-S-10	100.0
Sulfur	3.0
"SPDX-G"	0.8
Coumarone-indene Resin	3.0
ELC Magnesia	5.0
Zinc Oxide	100.0

Uniform Quality HORSE HEAD ZINC OXIDES

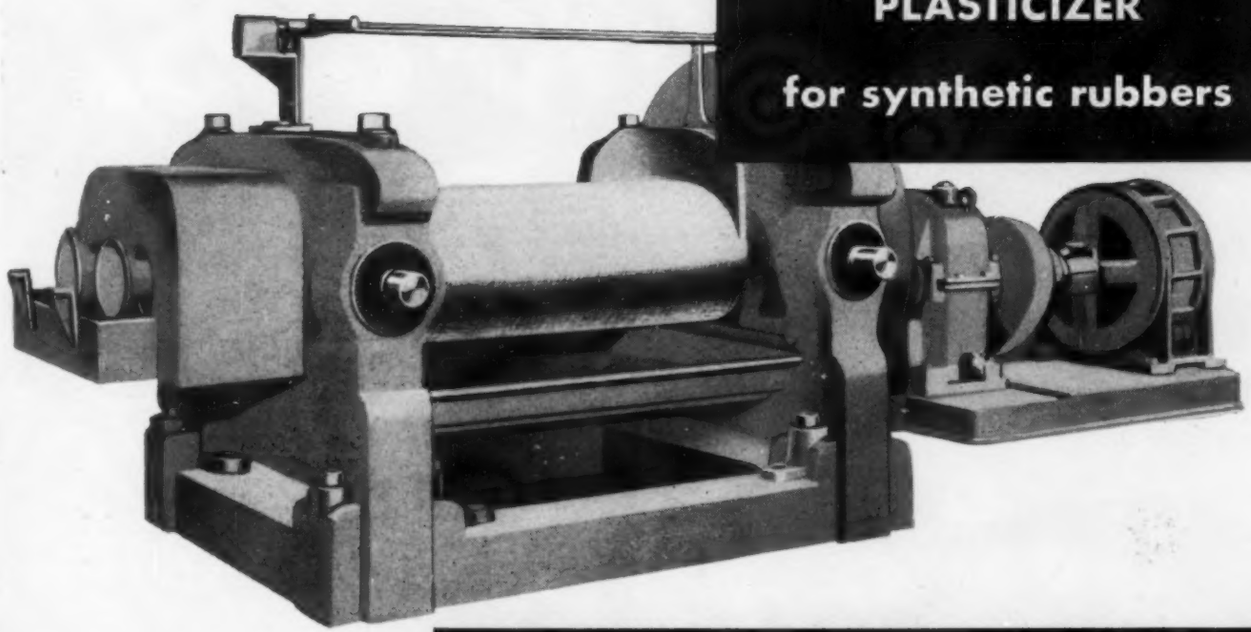
THE NEW JERSEY ZINC COMPANY
160 FRONT STREET • NEW YORK 7, N. Y.
Products Distributed by THE NEW JERSEY ZINC SALES COMPANY
NEW YORK • CHICAGO • CLEVELAND • SAN FRANCISCO

WORLD'S LARGEST PRODUCER OF SYNTHETIC RESINS

RCI

answering your demand

for a trustworthy
PLASTICIZER
for synthetic rubbers



RCI
Controlled-Quality

DIBUTYL PHTHALATE

RCI has resumed quantity production of the proved plasticizer for Vinyl, Neoprene and Buna N types of synthetic rubber—dibutyl phthalate. And with the return of this basic chemical to RCI's Line of Raw Materials comes reassurance of uniformity from batch to batch because RCI's system of control guarantees constant quality. Meeting Army Specification 50-11-61A and Army-Navy Specification AN-O-D-361, RCI Dibutyl Phthalate is thoroughly dependable. For further information write direct to the Sales Department.

Saturday Evenings at 8:30 (E.W.T.)
You Will Enjoy RCI's
"Symphony of the Americas"
Via Mutual Network Stations

ARMY E NAVY

REICHHOLD CHEMICALS, INC.

General Offices and Main Plant, Detroit 20, Michigan

Other Plants: Brooklyn, New York • Elizabeth, New Jersey • South San Francisco, California • Tuscaloosa, Alabama • Liverpool, England • Sydney, Australia

SYNTHETIC RESINS • CHEMICAL COLORS • INDUSTRIAL PLASTICS • INDUSTRIAL CHEMICALS

OPERATING COST

THE outstanding success of rayon-cord tires in wartime service was clearly indicated by the Army's exhaustive proving ground tests. These tests also indicate that tires of this construction should help reduce commercial operating costs.

For instance, in a long distance supply test, where heat and sustained operation were principal problems, synthetic rubber tires made with rayon cord averaged 330% better. In a rough terrain test, where bruising and cutting were principal problems, they averaged 93% better.

Although these tests do not necessarily apply to other conditions of service, they do foreshadow improved tire performance in commercial operation. Specifically, this means longer life, greater mileage, fewer road delays, higher running speeds. Add those benefits up . . . and the result is bound to be lower operating cost.

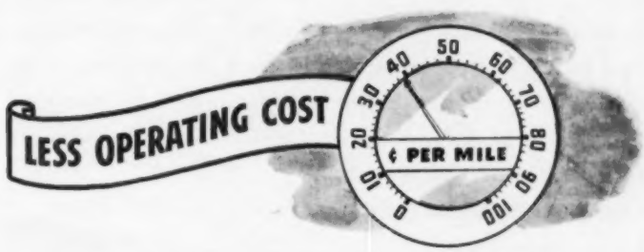
Source of data: Hearings before a Special Committee Investigating the National Defense Program, United States Senate—Seventy-eighth Congress, First and Second Sessions.

Less with Rayon Cord

"RAYON CORD BETTER IN BOTH SYNTHETIC AND PREWAR NATURAL RUBBER TIRES."—*Pyramid Motor Freight Corp.*

CHARLES ROSENTHAL, *Vice President* of this large over-the-road carrier, reports: "Prewar, we obtained about 40% more mileage with natural rubber tires containing rayon cord. With current synthetic rubber tires, performance is also considerably improved with rayon cord. Mileage is about 30% greater . . . blowout performance is decidedly better. Maintenance problems and road delays for servicing are also reduced."

Less friction heat, higher tensile strength and greater uniformity of rayon tire cords mean more safety at high running speeds.



Rayon-cord tires give longer life, greater mileage . . . reduce impact failures, road delays, tire renewals.

AMERICAN VISCOSE CORPORATION

America's Largest Producer of Rayon Tire Cord, Yarn, and Staple Fiber

Sales Offices: 350 Fifth Avenue, New York 1; Providence, R. I.; Charlotte, N. C.; Philadelphia, Pa.
Plants at: Marcus Hook, Pa.; Roanoke, Va.; Parkersburg, W. Va.; Lewistown, Pa.; Meadville, Pa.; Nitro, W. Va.; Front Royal, Va.

Inspecting a liner before processing

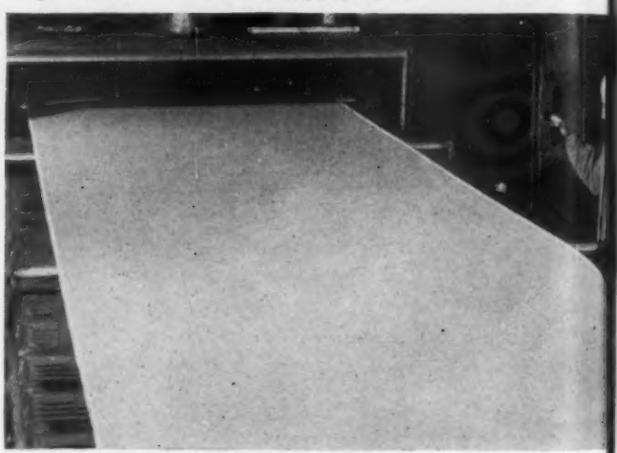
Compounding the processing solution

Applying solution to the fabric

CLIMCO
Craftsmanship

Experience and skill feature every step shown here, as your liner goes through our plant for Climco Processing. Many of our employees have been with us for years, and have gained invaluable "know-how" about our processing methods.

Leading rubber companies *prefer* Climco Processing because they have found it rapidly repays its cost by speeding production, plus saving man-hours and money. And many of these firms have *standardized* on Climco Liners because of their unvarying high quality that results from the craftsmanship used in our processing.



Drying the coated liner

Controlling the sheet to eliminate wrinkles

THE CLEVELAND LINER & MANUFACTURING CO.
5508 Maurice Avenue • Cleveland 4, Ohio

NEW Booklet

tells how to get better service from your liners. Illustrated with diagrams. Tells how to use liners more efficiently. Write for your copy now.

LINERETTE INTERLEAVING PAPER
Treatment Contains NO OIL OR WAX
Samples on Request

CLIMCO PROCESSED LINERS
for Faster, Better Production at Lower Cost

★

AMERICAN ANODE

Rubber and Plastics water dispersions for coating, impregnating, cementing

Pioneer in water systems seeks problems relating to paper and textile treatment

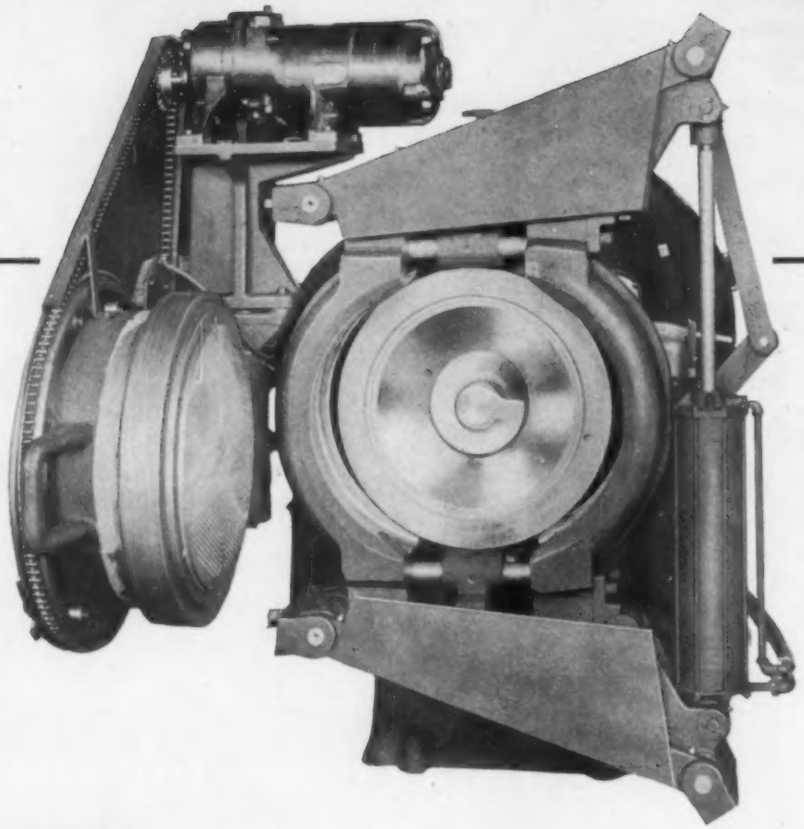
THERE are three good reasons why American Anode water dispersions of natural and synthetic rubbers and plastics can be used to advantage in treating fabrics and paper.

First, there's the *experience* that American Anode has accumulated over a period of many years. American Anode pioneered the work with water dispersed rubbers and plastics. That's why we invite you to submit your paper and fabric treatment problems to our development laboratory staff. We honestly believe that we can help you because we *know* how to use water dispersions most effectively.

Second, there's *economy.* Water systems do away with the need for expensive solvents and cumbersome solvent recovery systems. Processing is simplified. In most cases, it actually *costs less* to treat fabrics or paper using a water dispersion.

Third, there's *safety.* Water just won't explode, causing dangerous and expensive fires. Nor will water give off toxic fumes. Our laboratory facilities and research staff are at your service. For more information please write American Anode, Inc., 60 Cherry Street, Akron, Ohio.

AMERICAN ANODE
INCORPORATED
NATURAL AND SYNTHETIC RUBBER LATICES, WATER CEMENTS AND SUSPENSIONS



for more speed in screen changes, add this strainer head to YOUR EQUIPMENT!

NOW you can have the advantages of this latest development in strainer heads without completely replacing your present equipment.

How? By simply installing a new National strainer head on the machine you now have. So ingeniously is this head designed that it can be adapted to any straining machine now in operation.

You get greater production because screen changes can be made in less than one minute. Making the change is so easy that operators are willing to change them frequently—before clogging causes production slow-down.

Downtime is sharply reduced. Faster screen changes mean as much as 5 or 6 hours more production time in a 24-hour period.

Learn how effective a new National strainer head can be when installed on your *present* equipment . . . and how quickly the change will more than pay for itself. Write National Rubber Machinery Co., 917 Sweitzer Avenue, Akron 11, Ohio.

NATIONAL RUBBER MACHINERY CO.
General Offices: AKRON 11, OHIO

Creative Engineering

BAKER
PLASTICIZERS•

impart LOW TEMPERATURE *Flexibility*

TO
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ESTABLISHED 1857
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•CONTAIN NO PHTHALATE

VISTANEX POLYBUTENE
VISTAC

Now
Freely Available

WE are pleased to announce that both Vistanex Polybutene and Vistac have been released from all restrictions and are now available to the industry.

During the war, these materials were only available for highest priority use, but can now be supplied for all purposes.

Vistanex Polybutene and Vistac, being substantially colorless, non-oxidizing, non-vulcanizing hydrocarbons, we particularly recommend these products for pressure sensitive adhesives, adhesive cements and in rubber compounding for superior aging and heat resistance.

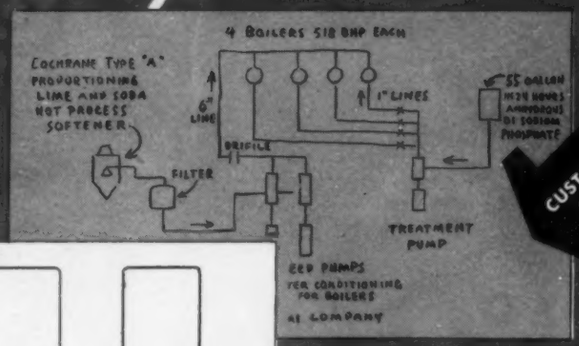
Our laboratory will be glad to cooperate with you on your technical problems and supply you with all required data and information.

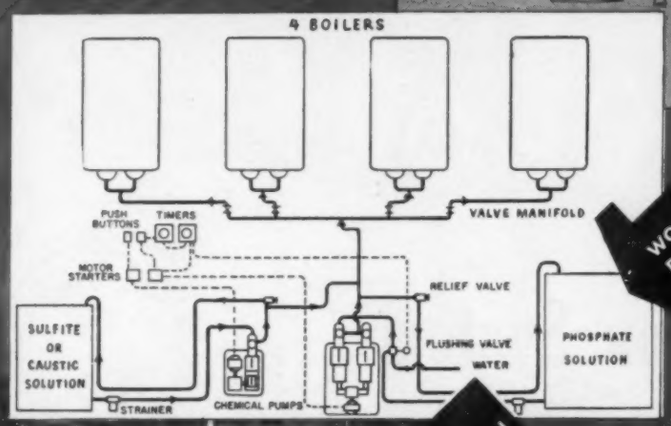
ADVANCED SOLVENTS & CHEMICAL CORP.

245 Fifth Avenue New York 16, N. Y.

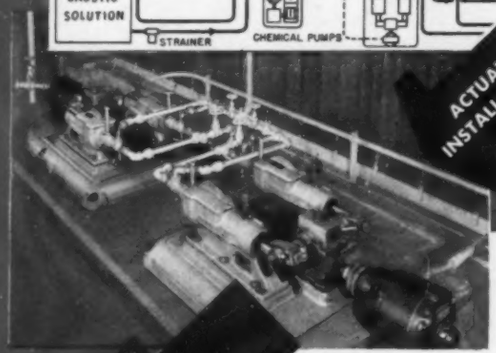
A *Working* PRINCIPLE

Adding the *proper* treating chemical, in the *correct* proportion, in the *right* location, at the *right* time.





TO *Mechanize* YOUR BOILER WATER CONDITIONING



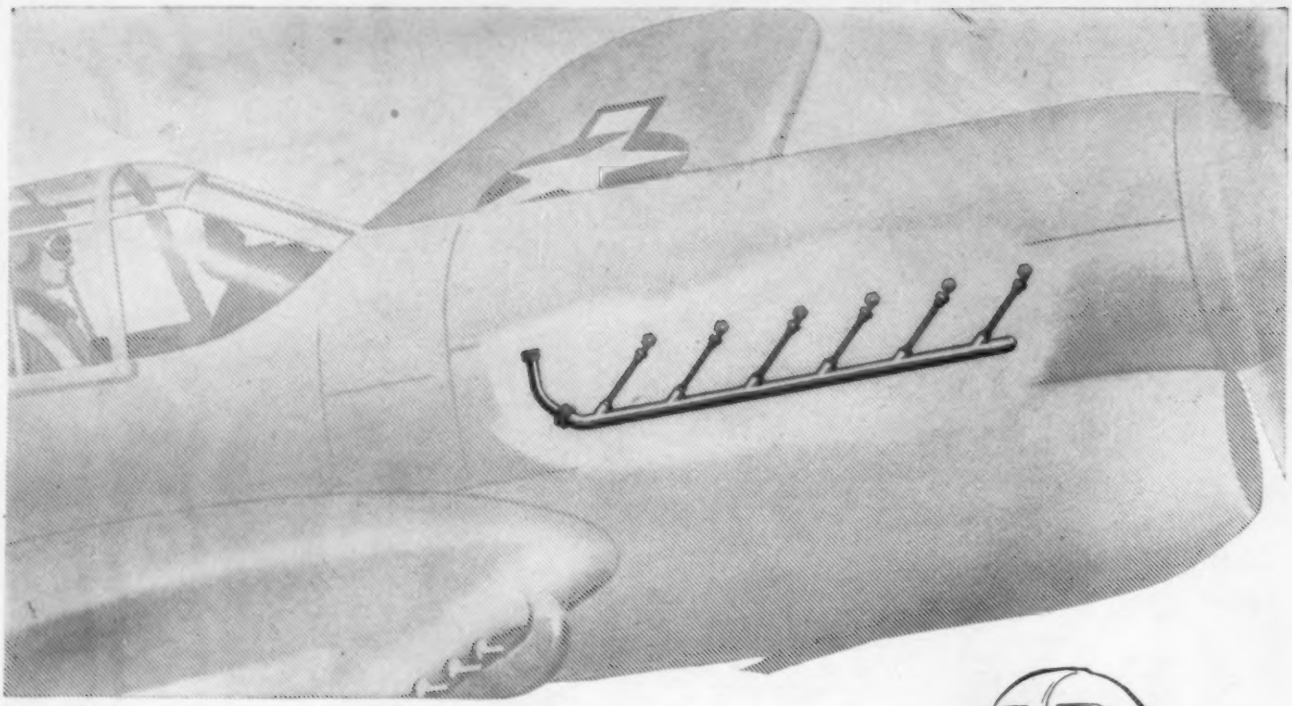
The success of your chemical treatment depends on strict adherence to an operating program. In many cases insufficient importance is given to the *method* and *regularity* with which the treatment is injected. By using the tried and proven %Proportioneers% system, you eliminate guesswork, assure accurate treatment, safeguard your boiler investment, improve heat transmission, save fuel and reduce costly shutdowns for repairs and cleaning.

Ask for Bulletin 1713

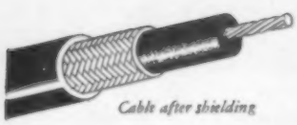
Continuous AUTOMATIC WATER CONDITIONING WILL WORK FOR *You*

% PROPORTIONEERS, INC. %

WRITE TO %PROPORTIONEERS, INC.% 66 CODDING ST., PROVIDENCE 1, RHODE ISLAND



Keeping an Ignition System off the Air . . . . . .



Cable after shielding

EVER hear somebody's electric shaver over your radio? That's the kind of noise, many times multiplied, a pilot would hear in his radio earphones if the ignition wiring on his plane were not properly shielded.

So, to prevent an ignition system from becoming a broadcaster . . . interfering with clear radio reception, the complete ignition harness is enclosed in a sheath of braided copper alloy conduit.

The braided shielding must withstand a wide range of temperature changes, from sub-zero to intense heat . . . the severe vibration of high-powered aviation engines . . . the terrific beating of tremendous wind pressures. Then, too, the higher the altitude the more difficult it becomes to prevent the leakage of electrical current. And to further complicate the problem, radio equipment is being constantly improved for greater sensitivity.

Braiding copper alloy wire for this important shielding function must be a precision job of fabrication to meet the exceedingly high specifications for Army and Navy planes.

Here at National-Standard we have developed methods of producing a uniform high quality of wire braided flexible conduit to successfully meet the extreme service requirements of some of America's fastest flying planes. We do not make the entire insulated cable... only the *tubular shielding* shown above.

Today we have machinery available to braid steel, brass, copper, stainless steel, and monel metal in tubular lengths from 1/16" to 16" in diameter. Perhaps these facilities can be profitably used in your manufacture of rubber or allied products...why not write and find out?

NS
NATIONAL-STANDARD Company
NILES, MICHIGAN

BUY AND KEEP WAR BONDS AND STAMPS

Divisions of National-Standard Company

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COLD ROLLED, HIGH-CARBON SPRING STEEL

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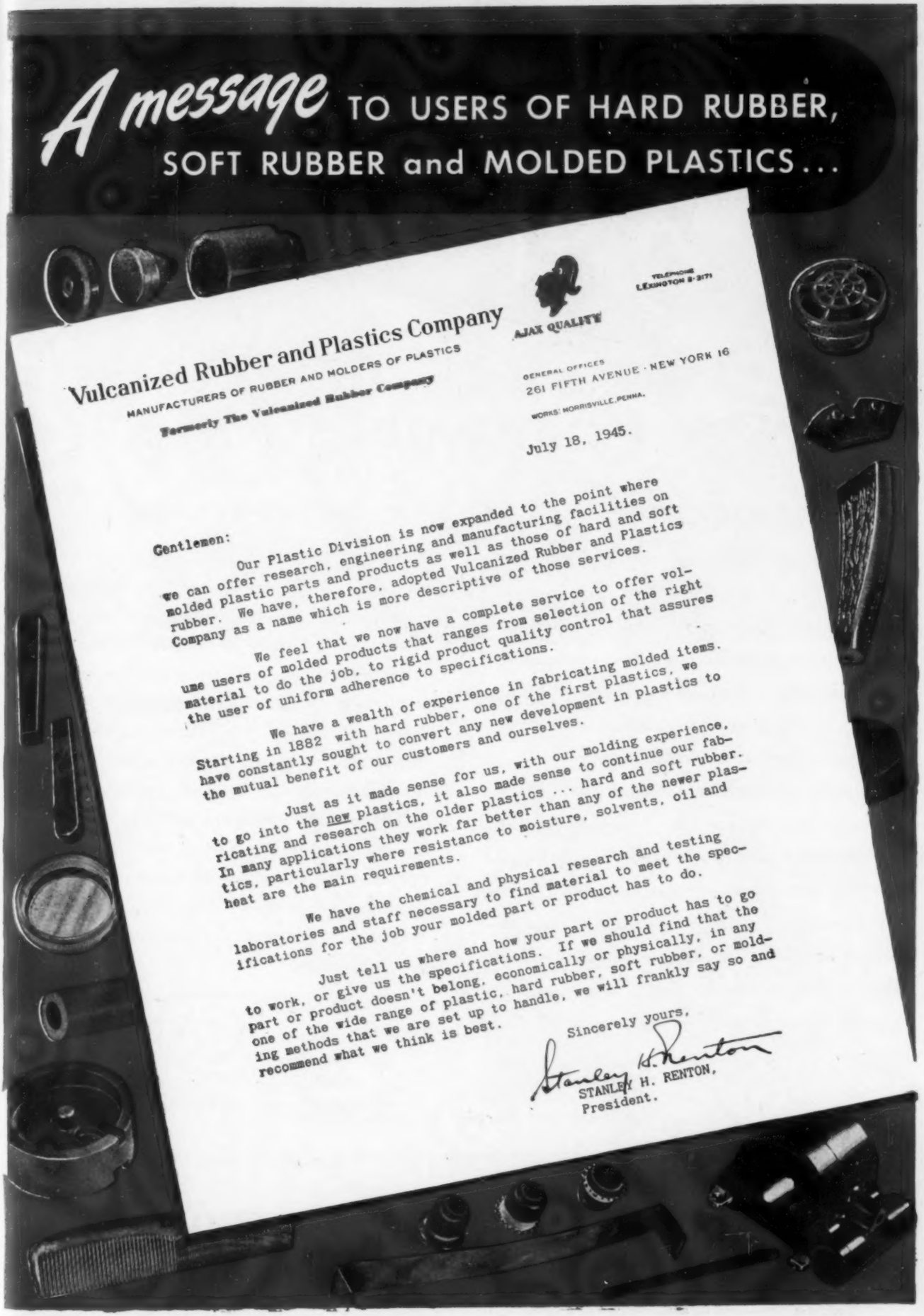
A message TO USERS OF HARD RUBBER, SOFT RUBBER and MOLDED PLASTICS...



Vulcanized Rubber and Plastics Company

MANUFACTURERS OF RUBBER AND MOLDERS OF PLASTICS

Formerly The Vulcanized Rubber Company

AJAX QUALITY

TELEPHONE LEXINGTON 2-2171

GENERAL OFFICES
261 FIFTH AVENUE · NEW YORK 16

WORKS: MORRISVILLE, PENNA.

July 18, 1945.

Gentlemen:

Our Plastic Division is now expanded to the point where we can offer research, engineering and manufacturing facilities on molded plastic parts and products as well as those of hard and soft rubber. We have, therefore, adopted Vulcanized Rubber and Plastics Company as a name which is more descriptive of those services.

We feel that we now have a complete service to offer volume users of molded products that ranges from selection of the right material to do the job, to rigid product quality control that assures the user of uniform adherence to specifications.

We have a wealth of experience in fabricating molded items. Starting in 1882 with hard rubber, one of the first plastics, we have constantly sought to convert any new development in plastics to the mutual benefit of our customers and ourselves.

Just as it made sense for us, with our molding experience, to go into the new plastics, it also made sense to continue our fabricating and research on the older plastics ... hard and soft rubber. In many applications they work far better than any of the newer plastics, particularly where resistance to moisture, solvents, oil and heat are the main requirements.

We have the chemical and physical research and testing laboratories and staff necessary to find material to meet the specifications for the job your molded part or product has to do.

Just tell us where and how your part or product has to go to work, or give us the specifications. If we should find that the part or product doesn't belong, economically or physically, in any one of the wide range of plastic, hard rubber, soft rubber, or molding methods that we are set up to handle, we will frankly say so and recommend what we think is best.

Sincerely yours,

Stanley H. Renton

STANLEY H. RENTON,
President.

New Compounds for...

FLOCKING

A completely satisfactory synthetic adhesive for flocking has long been a major problem to rubber chemists and manufacturers. We believe our new synthetic latex base compounds will overcome all of the previous difficulties no matter what method of application is used: — spraying, spreading or doctoring.

Adaptable to both cotton and rayon flock, these compounds are also non-inflammable, water-resistant, and can be pigmented to match the color of the flock or base material. A further advantage is the elimination of any additional extending, mixing, or dilution at your plant: — This General Latex compound is shipped in the form of an aqueous dispersion *ready for use.*

HEAT SEALING

General Latex has developed not one, but *a whole new family of compounds* for heat sealing paper, textiles, imitation leather, and associated products. The base is synthetic latex, but the other ingredients are varied in the compounding to fit the particular requirements of temperature, penetration, strength of bonding, flexibility, adaptation to unlike surfaces, and all other factors pertinent to the application.

These compounds are not carried in stock but can be supplied on short notice, tailor-made to your individual requirements. For a thorough analysis of any heat sealing problem you may have, we suggest that you get in touch with our laboratory.

GRS latex types, 2, 3 and X-160, normal and concentrated, available from stock.

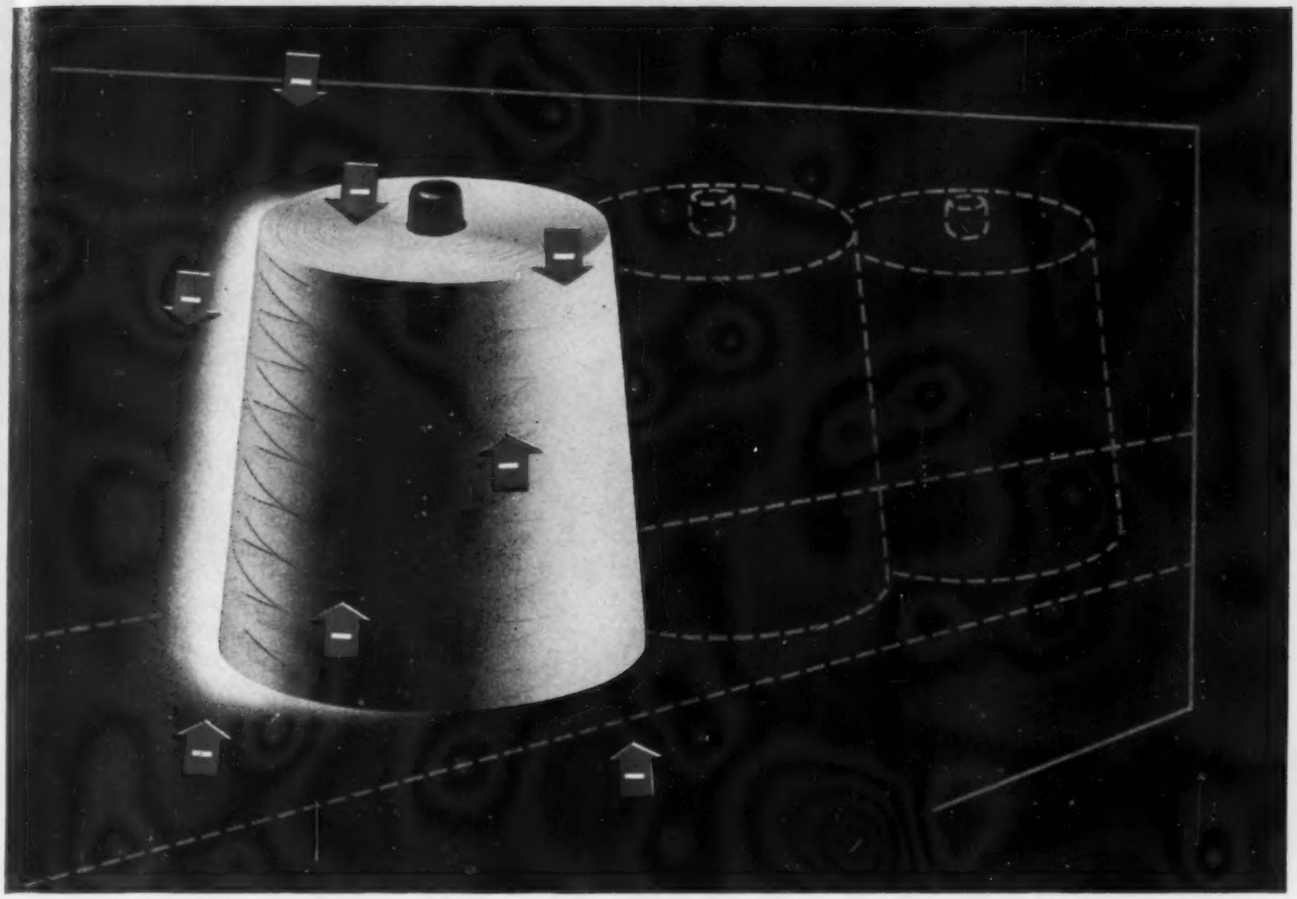
A Complete Service to Manufacturers

RESEARCH • MATERIALS • ENGINEERING • MANUFACTURE

General Latex & CHEMICAL CORP.

666 MAIN STREET, CAMBRIDGE, MASS.

Agents for Rubber Reserve Company for storage and distribution of natural rubber latex. Distributors for Rubber Reserve Company for synthetic latex. Operators of the Government-owned Baytown, Texas, synthetic rubber plant in collaboration with the General Tire & Rubber Co.



we give tire cord an electronic "permanent wave"

One good thing leads to another in the Industrial approach to production problems.

Asked by a leading tire manufacturer to produce large cones of tire cord to be used in making weftless fabric, we came up with an 18 pounder—the largest ever made.

But such a big, hard twist cone could not be twist-set by ordinary methods of applying heat and moisture. Industrial's technicians solved the problem by using the power of harnessed electrons in a process now known as *LEKTROSET.

To our knowledge this is the first application of its kind in the textile industry and the first time such a large package could be uniformly twist-set.

So well did this method do its job that the process was adopted by the tire manufacturer, under license from us, to use on all rayon cord shipped into its plants. Then we found that tire cord thus treated not only could be handled better but produced a better fabric and we therefore *LEKTROSET our Tyron cord on spools before it goes into our warpers and looms to be made into Tyron fabric.

This is just one example of how Industrial's integration of yarn, cord and fabric manufacture has resulted in improved products for the tire industry.

It's called *LEKTROSET Remember it!

Industrial RAYON CORPORATION
CLEVELAND, OHIO
NEW YORK OFFICE 500 FIFTH AVE

MAKERS OF

*Spun-lo RAYON YARN AND CLOTH and *TYRON YARN, CORD AND FABRIC

*Reg. U. S. Pat. Off.

WATER DISPERSIONS
for Special Requirements

Do you have any problems in the use of rubber and resin aqueous dispersions . . . synthetic rubber and resin latices . . . industrial adhesives . . . asphalt emulsions?

If so, by all means call on our technical men for help. They will work hand in hand with your own staff . . . studying, developing and perfecting from laboratory to finished product. They have had long experience in formulating and compounding these products for a multitude of varied applications. Their business is the selection of the *right* product to meet your requirement.

So send us details of your cementing, combining, impregnating and coating problems. We'll roll up our shirt sleeves and get to work with you!

THE FLINTKOTE COMPANY
30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.
Industrial Products Division
Atlanta • Boston • Chicago Heights • Detroit • Los Angeles
New Orleans • Washington • Montreal • Toronto

***SYNTEX PRODUCTS**
*Reg. U. S. Pat. Off.

UNITED CARBON COMPANY, INC.

77

KOSMOBILE
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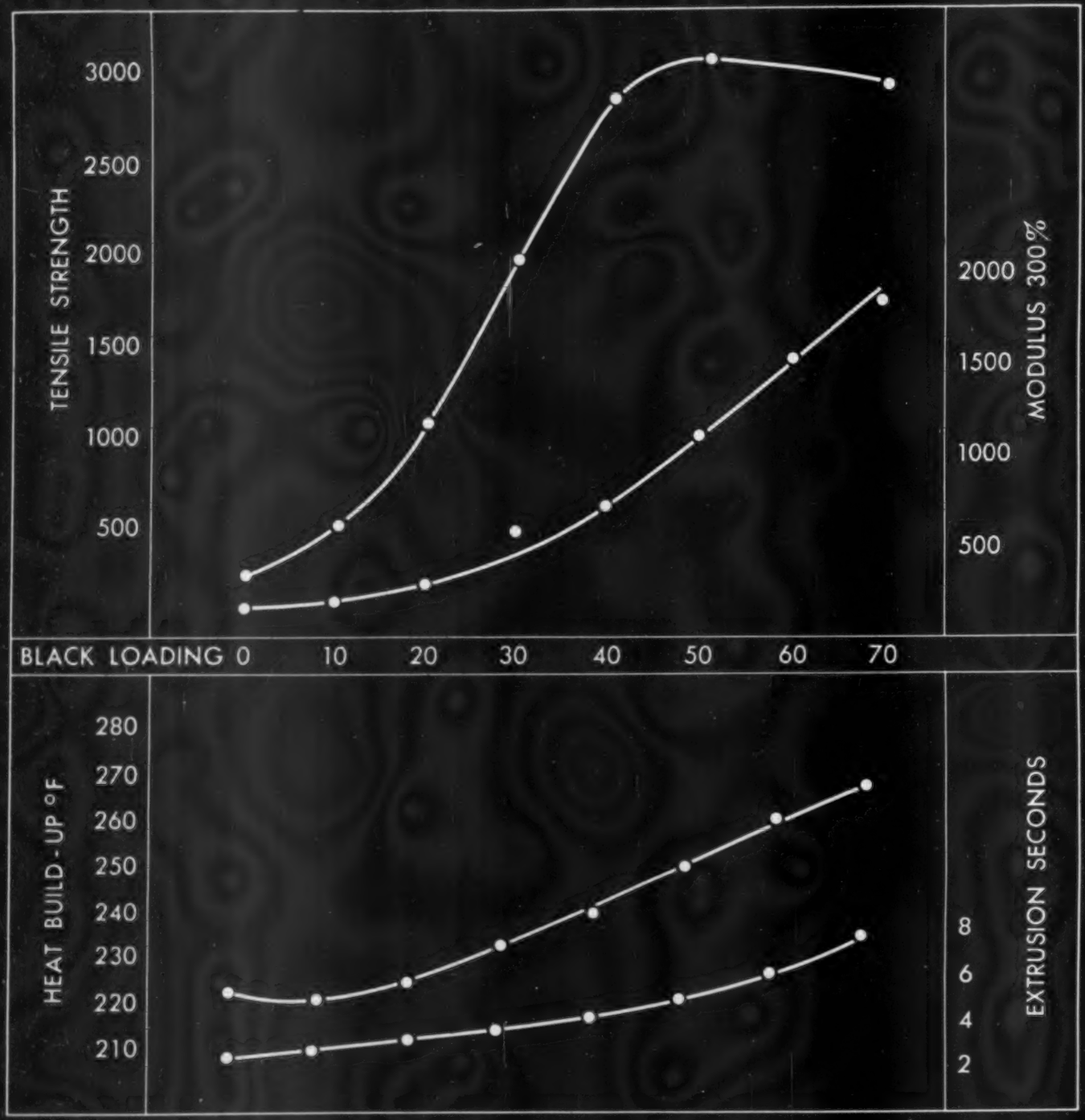
Charleston, West Virginia • New York • Akron • Chicago

EFFECT OF DIXIEDENSED 77 • KOSMOBILE 77

EASY PROCESSING, CARBON CHANNEL BLACK ON THE REINFORCEMENT OF GR-S



RESEARCH DIVISION

UNITED CARBON COMPANY, INC.

CHARLESTON, WEST VIRGINIA

Makers of plastic products approve Dipex*

DEVELOPED to serve a wider range of usefulness for manufacturers, DIPEX is a high quality anti-sticking agent. It can be advantageously used to mold rubber, reclaimed and synthetic rubber, resins and asphalts. It is freely soluble in water and can be applied to dilute solution by spraying, brushing or dipping. Because DIPEX is extremely light in color, it can be applied to molds for white goods to give clean, sharp designs.

Free samples available on request, together with full technical data.

*Reg. U. S. Pat. Off.

Stanco Incorporated

216 WEST 14TH STREET, NEW YORK 11, N. Y.

Copr. 1945, Stanco Incorporated

Awarded for Service

The men who are entitled to wear this button on their lapels have served their country well, and have been honorably returned to civilian pursuits. Let us not forget their faithful service.

Acknowledgment of service is also due the rubber reclaiming industry which has cooperated heartily to carry out the country's rubber program, and kept the war rolling on rubber.

PEQUANOC RUBBER CO.

QUALITY RECLAIMS FOR SPECIFIC PURPOSES

Factory and Main Office: **BUTLER, NEW JERSEY**

SALES REPRESENTATIVES

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46 HERGA COURT
HARROW-ON-HILL, MIDDLESEX, ENGLAND

FROM LABORATORY MIDGET TO PRODUCTION GIANT—

F/B CALENDER DESIGN FITS THE JOB

Here is an illustration of the wide range of sizes of Farrel-Birmingham Rubber and Plastics Calenders. From the 8"x16" laboratory size to the huge 32"x70" production machine, the physical proportions, materials, type of construction, lubricating systems, gearing, special operating features—in fact, every vital detail is designed to fit the job the calender is built to do. Here, in part, is how this principle is carried out in the units shown:

THE 32"x70" FOUR-ROLL PRODUCTION SIZE

Built for close control of gauge in double coating and multi-pass sheeting of rubber and plastics products, this calender has individual motors for each screw of the top, bottom and side rolls. This means that a screw can be operated independently to adjust one end of a roll, but can also be synchronized with the one at the other end for parallel adjustment.

Chilled iron rolls, carefully ground on the bodies and chamber-bored for steam circulation, are carried in full bronze-lined journal boxes. The housings and other parts are proportioned in size and weight to the large rolls, which offer more than three times the resistance to deflection ordinarily provided. Lubricating systems which provide a constant supply of lubricant to all moving parts contribute to higher operating efficiency, reduced maintenance and longer life.

THE 8"x16" FOUR-ROLL LABORATORY SIZE

Designed for experimentation and for small production of rubber and plastics stocks, this unit is entirely self-contained, the drive being enclosed inside the base. Journal boxes are flood-lubricated, with circulating pump, oil cooler and oil sump tank mounted in the base. An adjustable speed motor provides the optimum operating speed for any individual stock.

Write for further information regarding calenders or any of the other equipment listed on this page.

F-B PRODUCTION UNITS

Banbury Mixers • Plasticators • Pelletizers • Mixing, Grinding, Warming and Sheeting Mills • Bale Cutters Tubing Machines • Refiners • Crackers • Washers Calenders • Hose Machines • Hydraulic Presses • and other equipment for processing rubber and plastic materials.

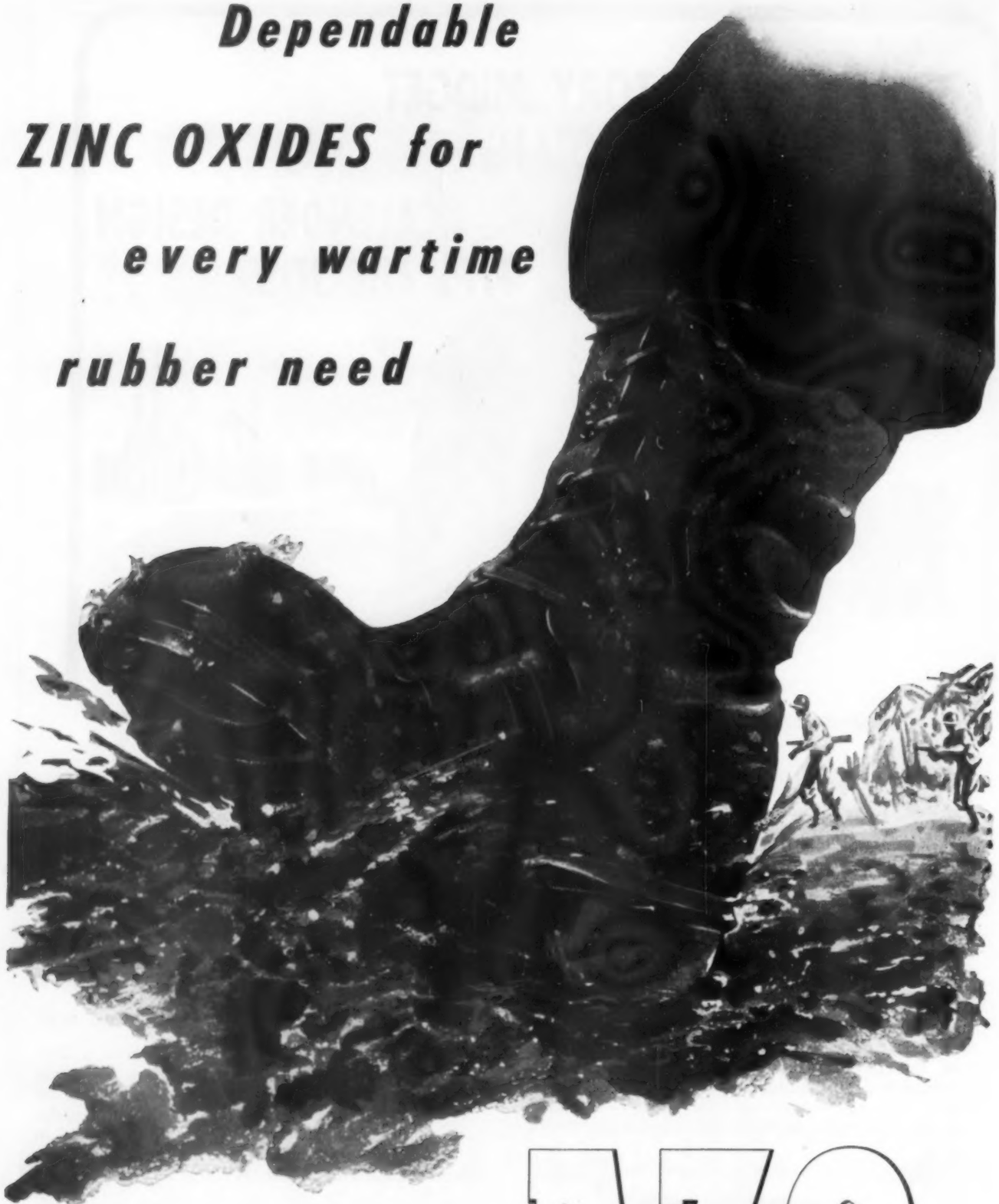
FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.

Plants: Ansonia, Derby and Stonington, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Pittsburgh, Akron, Los Angeles, Tulsa, Houston, Charlotte.

Farrel-Birmingham

FB-284

Dependable ZINC OXIDES for every wartime rubber need



AZO

ZINC OXIDES

AMERICAN ZINC SALES CO., Distributors for AMERICAN ZINC, LEAD & SMELTING CO.

COLUMBUS, OHIO - CHICAGO - ST. LOUIS - NEW YORK

. . . Back to Color

SILENE EF is now bringing back color to a wide range of products. . . And with this new opportunity in formulations of GR-S come improved standards of product performance. . . SILENE EF is a white reinforcing pigment. It lends itself readily to the production of any color compound and imparts exceptional physical properties to the finished goods. It minimizes box cracking, greatly improves elongation, increases abrasion-resistance, increases hardness where desired and improves hot tear.

SILENE EF

Write for test data on Silene EF and for technical assistance in applying this reinforcing pigment to your products.

STANDARD Chemical Company

General Offices: AKRON 8, OHIO

LOEWENTHAL & RUBBER

LOEWENTHAL & RUBBER

A four square service in supplying scrap rubber of proper grades that has proven itself throughout the life of the rubber reclaiming industry. We have the experience that insures proper sorting and the meeting of specifications.

Established 1868

THE LOEWENTHAL CO.

JACK SIDER, *President* J. K. McELLIGOTT, *Exec. Vice-Pres.*

We Solicit Your Inquiries

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159 CLEWELL STREET
AKRON 5, OHIO

Cable Address: "Gyblowell"

QUALITY CHEMICALS MAKE QUALITY RUBBER PRODUCTS

FOR UNIFORMITY AND PURITY IN RUBBER CHEMICALS ORDER THESE GENERAL CHEMICAL PRODUCTS:

BASIC CHEMICALS
GENERAL CHEMICAL COMPANY
FOR AMERICAN INDUSTRY

Sulfur: Commercial Rubbermakers' and other grades.

Sulfuric Acid: All grades and strengths.

Aluminum Sulfate: To precipitate polymerized synthetic rubbers.

Fluosulfonic Acid: For production of Boron Trifluoride.

Potassium Cyanide—Sodium Cyanide: In production of acrylonitrile rubbers.

Copper Fluoborate—Zinc Fluoborate—Copper Cyanide—Sodium Cyanide: Intermediates for "plating" rubber to metals.

Lead Fluoborate: For lead plating in battery manufacture.

Baker & Adamson Reagents and Fine Chemicals

GENERAL CHEMICAL COMPANY
40 RECTOR STREET, NEW YORK 6, N. Y.

Sales and Technical Service Offices: Atlanta • Baltimore • Boston • Bridgeport (Conn.) Buffalo • Charlotte (N. C.) • Chicago • Cleveland • Denver • Detroit • Houston • Kansas City • Los Angeles • Minneapolis • New York • Philadelphia • Pittsburgh • Providence (R. I.) San Francisco • Seattle • St. Louis • Utica (N. Y.) • Wenatchee • Yakima (Wash.)
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MT. VERNON
FABRICS
ASSOCIATED WITH UNIFORM QUALITY FOR OVER HALF A CENTURY
The Buried Feature in Quality Rubber Products

Even after it is buried in rubber, the quality of this MT. VERNON fabric will still be visible in the parent product. Its contribution of strength, long wear, and resistance to shock results primarily from top-grade cotton in a highly uniform weave. Close laboratory control through every step in its manufacture insures this repeated uniformity that makes for consistent product quality when you specify MT. VERNON fabrics.

MT. VERNON
WOODBERRY
MILLS, INC.

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40 WORTH STREET * NEW YORK, N. Y.

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It's New.. It's Cold.. It's Hot!

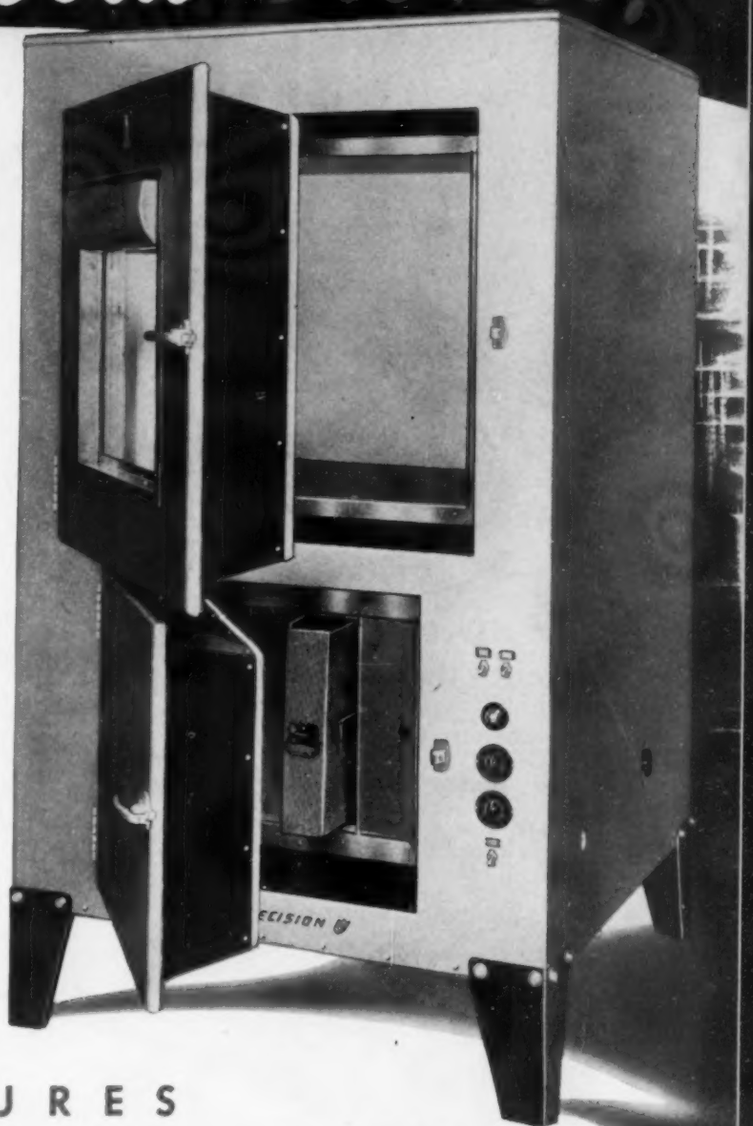
"PRECISION"
VARI-TEMP
CABINET

8 cu. ft. or 1 cu. ft. capacity
Temp. range —90° F. to +220° F.

This "Precision" Vari-Temp Cabinet operates with dry ice and was designed and developed to satisfy all the cold test conditions encountered and required by present day testing techniques, from —90° F. to +220° F. The vertical cabinet design with the large door provides easy access to a spacious chamber, sufficiently large to hold the various types of apparatus used for the tests. It will also accommodate the apparatus used in making the Young's Modulus test of natural and synthetic elastomers at normal and sub-normal temperatures, to ASTM D-797. The apparatus and specimens under test are readily visible at all times since there is no frosting or condensation on the surface of the observation window.

The incorporation of a heating unit in this cold chamber allows a full temperature testing range of from —90° F. to +220° F. The temperature is held at ±1° F. by individual regulators for the low temperature tests and for the high temperature tests.

Ample space has been allowed for the placement of apparatus in the cold chamber, a full 8 cu. ft. being available. Special apparatus can be mounted by means of holes, which can be drilled directly into the outer shell when necessary, as well as over the entire area of the bottom of the test chamber.



FEATURES

This "Precision" Vari-Temp Cabinet is of extremely rugged construction throughout, and is made to give years of service. The special construction and arrangement of the ducts prevent the carbon dioxide gas from entering the specimen test chamber. Mechanical convection provides uniform temperature.

Thermal losses are kept at a minimum by completely insulating the inner wall from the outer wall.

Metal plates 4" wide, the height of the chamber, are centered on each side of the rear, and on the top, to provide facilities for mounting the apparatus from any of these positions.

Insulating tubes prevent dissipation of cold from the inner chamber.

Heavy gage tinned copper has been used in all parts liable to corrosion due to condensation.

All temperatures are controlled thermostatically, one thermostat being provided for low temperatures, and one for high temperatures.

This cabinet is attractively finished in anti-corrosive aluminum.

Write for Bulletin No. 10020-K

See Your Laboratory Supply Dealer

PRECISION SCIENTIFIC COMPANY

1736-54 N. Springfield Ave., Chicago 47, U.S.A.

Engineers and Builders of Scientific Research and Production Control Equipment

Attention

RUBBER CEMENT USERS

UBS
Laboratories
SUBJECT: Ubapol
Ubapol is ideal for all air-drying assembly purposes where rubber cement was formerly used: fabric to fabric fabric to leather leather to leather paper to paper wherever the rubber cementing procedure was to coat the surfaces, allow drying time, and then complete the bond.
UBAPOL
Provides: RETACK · FLOW · BREAK
RUB-OFF · NON-PENETRATION

completely new solvent adhesive that matches rubber cement quality for quality . . .

First, UBS Technicians wrote down the characteristics needed in a synthetic rubber base to provide an adhesive with *all* the qualities industry used to look for in an air-drying rubber cement. *Then, starting from scratch, the UBS Laboratories developed a completely new synthetic rubber base to fit these requirements.* That's the story behind Ubapol! A completely new synthetic rubber solvent adhesive compounded to match rubber cement quality for quality. Ideal for all air-drying assembly purposes where rubber cement was formerly used.

Samples gladly sent upon request.

Address all inquiries to the Union Bay State Chemical Company, Rubber Chemicals Division, 50 Harvard Street, Cambridge 42, Massachusetts.

UBS

UNION BAY STATE
Chemical Company

Serving Industry with Creative Chemistry

ORGANIC CHEMICALS · SYNTHETIC LATEX · SYNTHETIC RUBBER
PLASTICS · INDUSTRIAL ADHESIVES · DISPERSIONS
COATING COMPOUNDS · IMPREGNATING MATERIALS · COMBINING CEMENTS

SHARPLES TRADE MARK CHEMICALS

The tremendous wartime expansion of the rubber industry has necessitated a parallel expansion in the production of rubber chemicals, and the development of new and varied types of rubber additives to meet the problems evolving from the compounding of the synthetic rubbers. These problems have not been solved by the magic of an Aladdin's Lamp, but by American research and ingenuity. Sharples has contributed to this program by greatly increasing its manufacturing facilities and by developing new compounding agents for the synthetic rubbers. Rubbing a magic lamp will not solve your compounding problems, but Sharples Rubber Chemicals may provide the solutions.

SHARPLES RUBBER CHEMICALS

VULCANIZING AGENTS	PLASTICIZERS	SOLVENTS FOR GR-S	BASIC CHEMICALS FOR RUBBER COMPOUNDING MATERIALS
VULTAC* NO. 1	Pentalenes †	Dichloropentanes	Ethylamines, Butylamines, Amylamines, Ethylethanolamines, Diethylaminoethanol, Butylethanolamines, Dibutylaminoethanol.
VULTAC* NO. 2	Dialkyl Acid Amides ‡	Mixed Amyl Chlorides	*Also other alkyl and alkylalkylolamines available in experimental quantities.*
VULTAC* NO. 3			

* Trade Name Registered. Chemically the VULTACS are alkylphenol sulfides.

† Trade Name Registered. Chemically the Pentalenes are Amyl Naphthalenes.

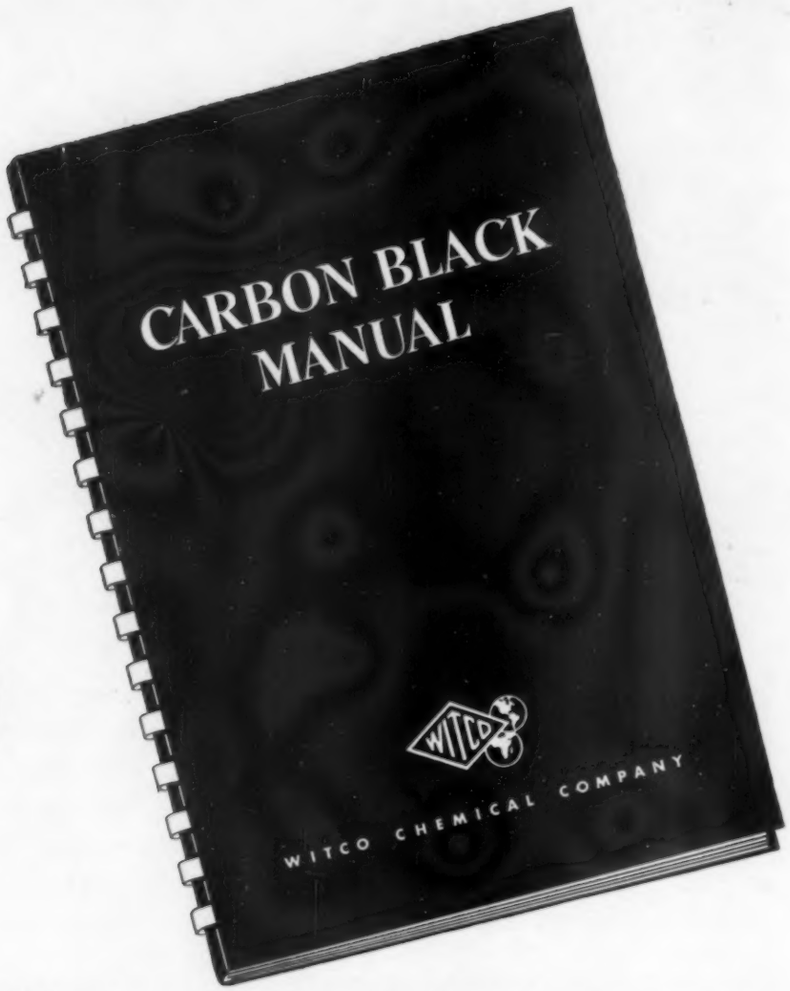
‡ Available in experimental quantities only.

Further information and samples will be sent promptly upon request.

SHARPLES CHEMICALS INC.

PHILADELPHIA CHICAGO NEW YORK

NEW... AND COMPLETE!



Here is the new Witco Carbon Black Manual, a comprehensive, up-to-date text on the properties and applications for the wide range of Channel and Furnace type Carbon Blacks manufactured and supplied by Witco.

This new manual contains carefully compiled information of immediate and lasting value to both rubber compounders and buyers of rubber processing materials.

It is yours for the asking.

COMPLETE, too, are Witco's lines of both Channel and Furnace Type Blacks. They cover carbon black need for the compounding of both natural and synthetic rubber. In addition, Witco offers wide variety of other materials for use in rubber production, among which are:

- **FILLERS**
- **SOFTENERS**
- **DISPERSING AGENTS**
- **ACCELERATORS**
- **ACCELERATOR ACTIVATORS**
- **COLORS**

AND OTHER PRODUCTS

Full information on these products is contained in our booklet, WITCO PRODUCTS, which is also yours for the asking.

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[CONTINENTAL CHANNEL AND FURNACE BLACKS]

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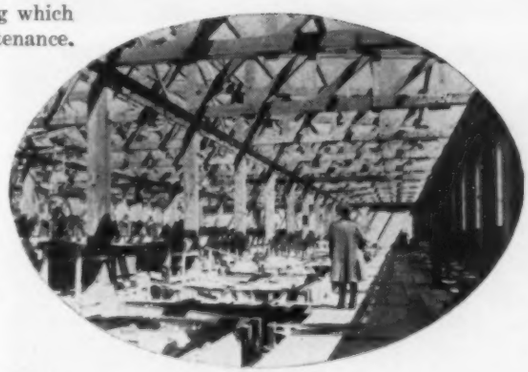
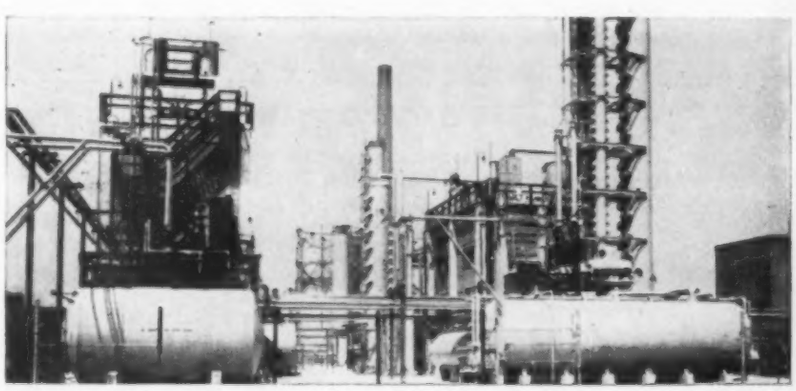
This is one of the synthetic rubber chemical plants. On its many buildings are roofs built of Koppers Coal Tar Pitch and Tarred Felt. This is one of the oldest current types of roofing. Coal Tar Pitch is the type of roofing which has set up many of the records for long life and freedom from maintenance.



PRESSURE-TREATED WOOD GIVES LONG LIFE AND ECONOMY IN CONSTRUCTION

The roof trusses in this building in a synthetic rubber chemicals plant are of wood pressure-treated to resist decay and termites and to retard fire. This wood matches mild steel in strength-per-pound, and can be "engineered" in advance for easy erection.



COAL CHEMICALS GO INTO ANTI-OXIDANTS, VULCANIZATION ACCELERATORS

Koppers recovers and processes coal carbonization chemicals, including benzol, toluol, xylol, naphthalene, tar acids, tar bases and other chemicals which go into the manufacture of anti-oxidants, vulcanization accelerators, tackifiers, etc.

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THE INDUSTRY THAT SERVES ALL INDUSTRY

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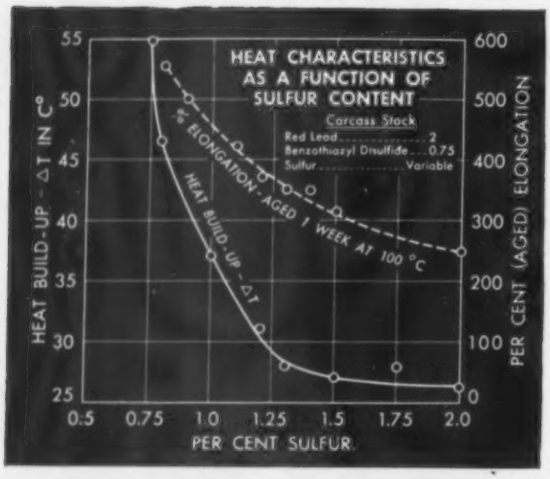
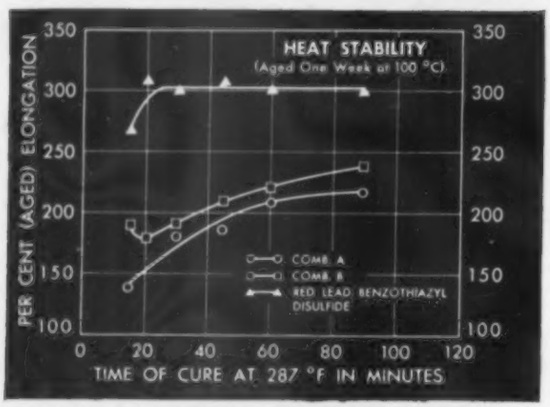
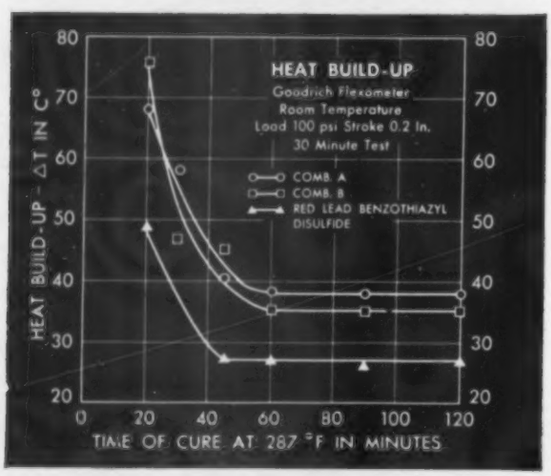
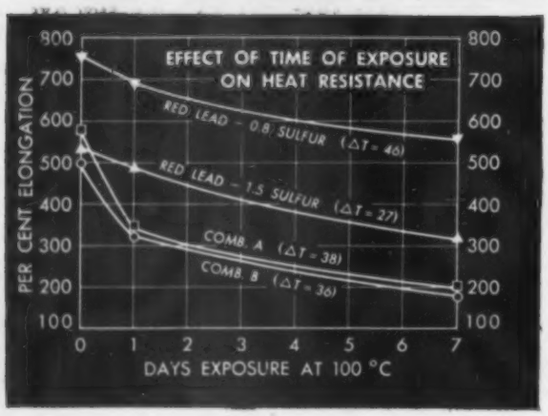

HEAT CHARACTERISTICS AS A FUNCTION OF SULFUR CONTENT
Carcass Stock
Red Lead 2
Benzothiazyl Disulfide 0.75
Sulfur ..... Variable
% ELONGATION - AGED 1 WEEK AT 100 °C
HEAT BUILD-UP - ΔT
HEAT BUILD-UP - ΔT IN C°
PER CENT (AGED) ELONGATION
PER CENT SULFUR


HEAT STABILITY
(Aged One Week at 100 °C)
COMB. A
COMB. B
RED LEAD BENZOTHIAZYL DISULFIDE
PER CENT (AGED) ELONGATION
TIME OF CURE AT 287 °F IN MINUTES




EFFECT OF TIME OF EXPOSURE ON HEAT RESISTANCE
RED LEAD - 0.8 SULFUR (ΔT = 46)
RED LEAD - 1.5 SULFUR (ΔT = 27)
COMB. A (ΔT = 38)
COMB. B (ΔT = 36)
PER CENT ELONGATION
DAYS EXPOSURE AT 100 °C

Heat build-up and heat stability . . . both improve when you compound GR-S with RED LEAD

Have you had difficulty making your GR-S carcass stocks both heat resistant and cool running?

If so, try the right combination of red lead, benzothiazyl disulfide and sulfur.

Its acceleration is sufficiently active and efficient to provide—concurrently—heat stability and low heat build-up.

Note the following table and the accompanying charts.

FORMULA

GR-S (Institute)	100
S.R.F. Black	30
Zinc Oxide	3.0
Paraflux	7.5
No. 2 R.M. Red Lead	2.0
Benzothiazyl Disulfide	0.75
Sulfur	1.5

Physical Properties

T/287° F.	Tensile Strength	% Elong.	T-300	Shore	ΔT° in C°
15	1520	860	315	....	....
20	1630	780	390	46	49
30	1450	630	520	47	47
45	1330	530	570	47	27.5
60	1210	480	520	47	27
90	1130	500	590	47	26
120	1100	500	610	47	28

	Aged One Week at 100° C.			Aged 48 Hours at 100° C.	
T/287° F.	Tensile Strength	% Elong.	T-300	Shore	ΔT° in C°
15	910	270	.....	....	....
20	1080	320	1000	54	30.5
30	990	300	990	54	30.5
45	1050	310	1000	53	29.5
60	1130	300	1090	53	26
90	1090	300	1090	53	25
120	1160	340	1100	53	25

° Goodrich Flexometer operated at room temperature. 30 minute tests. Load 100 psi, stroke 20%.

SUMMARY OF ADVANTAGES

1. Imparts improved heat resistance—retention of elasticity.
2. Imparts improved heat build-up—cooler running.
3. Relatively faster curing rate.
4. Safe processing.
5. Excellent general physical properties.
6. Broad curing plateau—very little change in properties on overcures.
7. Economical.
8. Available.

The charts illustrated are taken from a report on recent experimental work by the Rubber Division of our Research Laboratories on the problem of heat build-up and heat stability in GR-S stocks. Write for your copy. The report is titled, "The Heat Problem in GR-S Carcass Stocks."

NATIONAL LEAD COMPANY New York, Buffalo, Chicago, Cincinnati, Cleveland, St. Louis, San Francisco; Boston (National-Boston Lead Co.); Pittsburgh (National Lead & Oil Co. of Penna.); Philadelphia (John T. Lewis & Bros. Co.).

RECIPE NUMBER	8645-5-6	8644-5-6
Perbunan	100.0	100.0
Zinc Oxide	5.0	5.0
Stearic Acid	1.0	1.0
Semi-Reinforcing Furnace Black	75.0	75.0
Cumar P-25	20.0	
B.R.T. #7		20.0
Altax	1.0	1.0
Sulfur	1.5	1.5

Perbunan 18 synthetic rubber especially developed for extreme low temperature service

		PLASTICIZER CUMAR P-25		PLASTICIZER BRT No. 7	
		PERBUNAN 18	PERBUNAN 26	PERBUNAN 18	PERBUNAN 26
ASTM Low Temperature Brittleness Test D736-43T	O.K.	−80°F.	−35°F.	−55°F.	−35°F.
	Broke	−85°F.	−40°F.	−60°F.	−40°F.

VOLUME CHANGE WITH IMMERSION

7 days at 158°F. in Aircraft Hydraulic Oil Univis J-43	+7.9%	+1.2%	+12.6%	+2.4%
70 hrs. @ 300°F. ASTM Test Oil Number 1	−6.0%	−8.8%	−1.4%	−6.9%
70 hrs. @ 212°F. ASTM Test Oil Number 3	+33.0%	+12.5%	+36.8%	+14.1%

PERBUNAN 18 is a new member of the Perbunan family. However, there is every reason to believe that this new product will grow to be a strong and useful citizen in the synthetic rubber world.

PERBUNAN 18 is contrasted here with Perbunan 26 to illustrate its superiority for low temperature service. Both compounds are good stocks for general mechanical services. If you need a special rubber compound for a specific purpose, consult the *Perbunan Compounding and Processing Manual.* Write or phone us today if the complete answer to your problem is not there.

STANCO DISTRIBUTORS, INC., 26 Broadway, New York 4, N. Y.; First Central Tower, 106 So. Main St., Akron 8, Ohio; 75 East Wacker Drive, Chicago 1, Illinois. West Coast Representatives—H. M. Royal Inc., 4814 Loma Vista Avenue, Los Angeles 11, California. Warehouse stocks in New Jersey, California and Louisiana.

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CANVAS TO METAL

FABRIC TO LEATHER

FABRIC TO FABRIC

PLASTIC TO PLASTIC

?

WE HAVE THE ANSWER TO YOUR BONDING PROBLEM

We have it or we'll find it. Our case histories cover not only many pre-war bonding problems, but just about every cementing operation in the manufacture of war equipment — life rafts and life belts, raincoats, storm suits, gas masks, pontons, combat boots, delousing bags, jungle hammocks, barrage balloons and many other items.

Many of these new formulations, developed under war pressure, are applicable to civilian use.

Long experience with synthetic rubbers and resins, plus our constant study and daily development of new formulations and techniques, are solving specific problems for our customers.

This experience offers you a valuable laboratory resource for developing just the right cements for your special needs.

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Of GR-S Compounds

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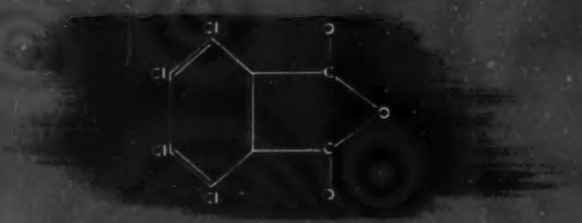
Niathal

TETRACHLORO PHTHALIC ANHYDRIDE

A NEW AND VERSATILE INDUSTRIAL CHEMICAL For Which A Manufacturing Process Has Been Developed

● NIATHAL* is fully chlorinated Phthalic Anhydride—all four hydrogen atoms being replaced by chlorine. The molecular structure of Tetrachloro Phthalic Anhydride may be represented as follows: The molecular weight of this compound is 285.9 and the chlorine content is 49.6%. It is made by a novel process for which patent protection is pending.



PROPERTIES—NIATHAL is an almost white, odorless powder. Its purity is greater than 99%, the remainder being chiefly chemically bound water. It is free-flowing and non-hygroscopic.

NIATHAL melts with very slight decomposition at 254-255°C (255°C = 491°F), as against 254.9°C for the 100% pure compound. It has an appreciable vapor pressure at elevated temperatures and particularly above its melting point. It boils at approximately 362°C (684°F).

Although our own experience indicates that NIATHAL is non-irritating and non-toxic, we recommend suitable precautions when using it for making new compounds and products.

SOLUBILITY—100 parts of water dissolves with difficulty up to 0.33 parts of NIATHAL at 20°C and about 1.6 parts at 90°C, forming the corresponding dibasic acid. A pH of about 2.0 characterizes this solution.

With caustic soda or caustic potash solutions NIATHAL readily forms the neutral alkali salts, both of which are highly soluble; about 35% aqueous solutions of these salts may be obtained at 65°C. These salts, as well as the slightly soluble acid salts, form crystalline solids. NIATHAL forms nearly insoluble salts of several common metals.

NIATHAL is soluble in several organic solvents. For example, 2 to 6% solutions may be obtained at room temperature in Acetone, Benzene, and Chlorobenzene. Solubilities materially increase with elevation of temperature.

USES—Since Phthalic Anhydride has found extensive use in numerous synthetic organic chemical industries, it is predicted that the chlorinated product will also find large and varied outlets. The introduction of almost 50% chlorine into the molecule yields new and interesting properties. The chemical structure is highly stable. This fact, in combination with high melting point, suggests that compounds made from NIATHAL may be used at more elevated temperatures. High chlorine content also improves resistance to fire.

NIATHAL is suggested for use as an intermediate or compounding material in the manufacture of . . .

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With the advent of the war, these manufacturers more than ever relied upon St. Joe Zinc Oxide to attain that degree of quality in their products which rigid Government specifications made mandatory.

And when peace is won, time-tested St. Joe lead-free Zinc Oxide will continue to be relied upon to impart quality to all products of which it forms a part.

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"……!"

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Many a leading manufacturer has already discovered that cartons made of *Coated* Lithwite, the revolutionary, machine-coated paperboard, have a crispness and brilliance that get attention, make them speak out above competition. *Coated* Lithwite holds up colors with eyecatching brilliance, enables you to present a persuasive, "speaking likeness" of your product. And its velvet-smooth surface gives your package a look and feel that says there's *quality* inside.

As you plan your postwar packages, keep *Coated* Lithwite cartons in mind. The day is coming when Gardner-Richardson will again be able to accept orders for cartons made of this revolutionary machine-coated paperboard that turns "*Silent Salesmen*" into *talking* packages.

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Manufacturers of Folding Cartons and Boxboard

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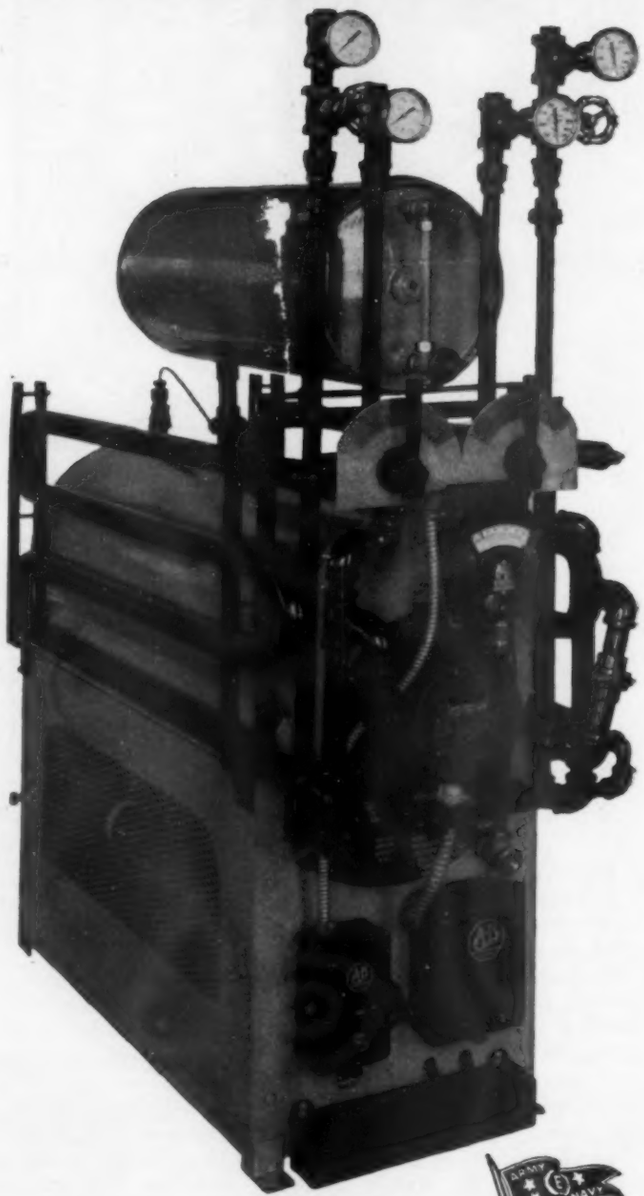

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NO SUBSTITUTE FOR SANTOCURE'S VERSATILITY

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- As much or as little delayed action as desired.
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NO SUBSTITUTE FOR SANTOCURE'S FOUR FREEDOMS

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TODAY, in Huber-owned plants, using Huber natural gas exclusively, the annual production of Huber Carbon Blacks has been raised from 45 million pounds to 85 million pounds. In this feat of virtually doubling production, rigid control of quality and uniformity have been faithfully maintained. For example: Huber Wyex Black has been the Government specified carbon black pigment for the testing control of the entire synthetic rubber (GR-S) program both in the United States and Canada.

Through the years, the dependable uniformity of Huber Carbon Black, known the world over, typifies the strict standards of careful research and production control that always guide our manufacture.

HUBER

Tomorrow, the vast experience and expanded facilities of our organization will continue to provide the finest quality Carbon Blacks for the Rubber Industry.

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VOLUME 57
NUMBER 6

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VOL. 57, No. 6 SEPTEMBER, 1945

High-Speed Microtome for Electron Microscopy

By W. A. LADD and H. A. BRAENDLE

Research Laboratories, Columbian Carbon Co., Brooklyn, N. Y.

THE electron microscope, although it has solved many perplexing problems and opened up new vistas of research, has introduced new problems to microscopy. One of the more serious of these has been the preparation of specimens thin enough for penetration by the electron beam. Conventional microtomes are rarely capable of producing specimens thinner than 1 micron. These sections are too thick for use in the electron microscope. Much of electron microscopy has therefore consisted of examination of dispersions of dust, powder, bacteria and the like, on collodion or Formvar films less than 10 mμ in thickness. Considerable work has also been done on thin film replicas of irregular surfaces.

Electron microscopy of carbon black *(1, 2, 3, 4, 5, 6)* showed this colloidal material to be much finer than had been anticipated and challenged investigators to examine it *in situ* in media in which it has become an essential ingredient. Dispersed in nitrocellulose by the Coblac process *(7)*, the carbon particles appeared well dispersed *(1)*. Because of its important position in the natural rubber industry and its critical position in the synthetic rubber industry, it became necessary to devise ways and means of examining this colloid *in situ* in rubber.

Cement films of carbon-in-rubber dispersion were prepared and examined *(8)* and some interesting deductions on carbon of various types were drawn. This technique was carried still further by Hall, Hauser, et al *(9)*, who reduced the film thickness to the point where rubber filaments were obtained. This led to interesting deductions as to the colloidal nature of the polymer itself. Neither of these techniques was wholly satisfactory for studying the disposition of carbon particles in vulcanized rubber.

In October, 1944, one of the present authors published details of a replica method and a micro-vulcanization technique *(10)* which showed the disposition of the carbon black in rubber under the high resolving power of the electron microscope. Amongst other things, it was possible to demonstrate varying degrees of persistence of reticulate chains through rubber mixing and curing techniques for various types of carbon *(11)*.

However, it was still highly desirable to be able to section submitted samples of vulcanized rubber thin enough to be examined under the electron microscope. This presented two difficulties; namely, the cutting of sections much thinner than has been possible with even the best of commercial microtomes, and the well-recognized difficulties of micro-sectioning rubber specimens for even the light microscope *(12, 13, 14)*.

In November, 1943, O'Brien and McKinley *(15)* made a great forward step in the art of thin sectioning. They moved a specimen toward a knife travelling at a speed of 100,000 inches per minute (95 m.p.h.). No actual photographs were shown, but by implication they worked exclusively with biological specimens.

In the construction of the presently described microtome, it was necessary, primarily because of wartime shortages of materials and skilled help, to use standard available laboratory equipment and adapt it to even more severe specifications than those described by O'Brien and McKinley. A high-speed centrifuge was selected as a carrier for the knife. The specimen is raised into the path of the blade by a motor-driven micrometer feed fitted to the centrifuge and operated through a gear train and variable speed pulley system. A photograph of the completed microtome is shown in Fig. 1.

Centrifuge

Several factors were considered in the choice of a suitable centrifuge:

1. A maximum speed of 200 to 300 m.p.h. for the cutting knife was desired. This was obtained from a centrifuge of 5000 r.p.m. and a head of 14 inches in diameter; the knife circle diameter 15½ inches giving a maximum cutting speed of 230 m.p.h.
2. A heavy head was considered necessary to provide high momentum. Final weight of the head is 8 kilograms.
3. The bearing in which the centrifuge shaft turns should be of a type which allows the specimen to be rigidly connected to it. In the centrifuge used, the specimen was connected to a wooden disc which in turn was fastened securely to the outside of the bearing. This overcame the difficulty of axial precession of the head and knife.
4. A reinforced steel case should be used to provide maximum protection in case of accident.

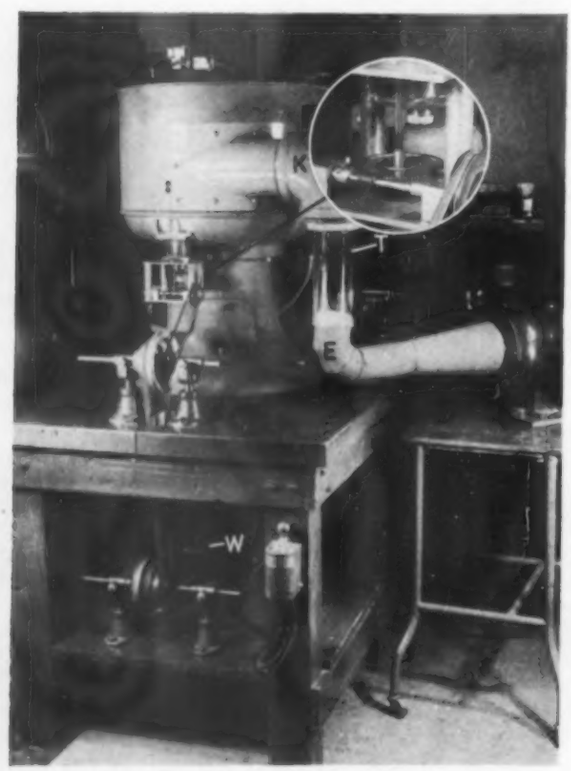

FIG. 1—High speed microtome.

Installation of Knife

The method of securely fastening the knife in the head is shown at (a) in Fig. 2. A hollow cylinder (B) is held inside the head by means of a flange (C) and screws. Inside this, fit two half-cylinders (D) between which the blade is gripped. Four set-screws (E) clamp the units together. A ¼ inch bolt (F) prevents the blade from becoming detached from the head in the event that the set-screws should loosen. Flanges on the half cylinders likewise are a safety precaution so that no part can break loose in case any screws fail. This half cylinder type of assembly allows easy adjustment of the cutting angle of the knife.

A counter-weight, (c) Fig. 2, is placed diametrically opposite the knife. The balance of the complete head may be adjusted by motion of the two nuts and lock-washers shown. Lock-washers are used throughout the assembly.

Specimen Holder and Feed

A hand type microtome was first used as a holder for the specimen. This was found unsatisfactory for two reasons: the clamping arrangement and body of the microtome were too light, and secondly, the threads in the feed would not withstand the wear to which they were subjected. Consequently the holder shown in (d) Fig. 2 was constructed. A feed of 488 microns per revolution is obtained from a 52 T.P.I. thread. Adjusting rings (G) and (H) allow tightening of the barrel on the threads and spindle of the specimen holder so that any play can be eliminated. The paraffin used for imbedding the specimen is molded in the holder (e) Fig. 2. Two screws prevent the paraffin from turning. This holder in turn fits snugly into a hole in the end of the spindle and is securely held by a cap (K).

The feed mechanism is also shown in Fig. 2. A worm drives a 100 tooth gear (L) which in turn drives the 6 tooth pinion wire (M). This drives a 100 tooth gear (N) fastened to the spindle of the specimen holder. This gear train gives a reduction of 1667:1. It is connected to a motor through a series of pulleys which includes a variable Speedmaster pulley (W), Fig. 1, allowing the speed of the worm to be changed from 100 to 1600 r.p.m. The motor is connected through a reversing switch.

Elimination of Axial Precession

The centrifuge used has a bearing (O) in which the spindle (P) turns. This bearing is free to precess with the spindle and is loosely supported in the case by means of a rubber ring (R). This bearing was used to overcome the upward and downward motion of the knife due to precession of the head. A wooden disc turned to fit inside the centrifuge case, with about ⅛ inch clearance all around, was fastened to the spindle bearing referred to above. The specimen holder was supported on this wooden disc so that the specimen precessed with the head and knife, thus eliminating any relative motion due to axial precession. The wooden disc was approximately balanced by lead poured into holes drilled diametrically opposite the specimen holder. Longitudinal motion of the head along the axis itself has been found negligible.

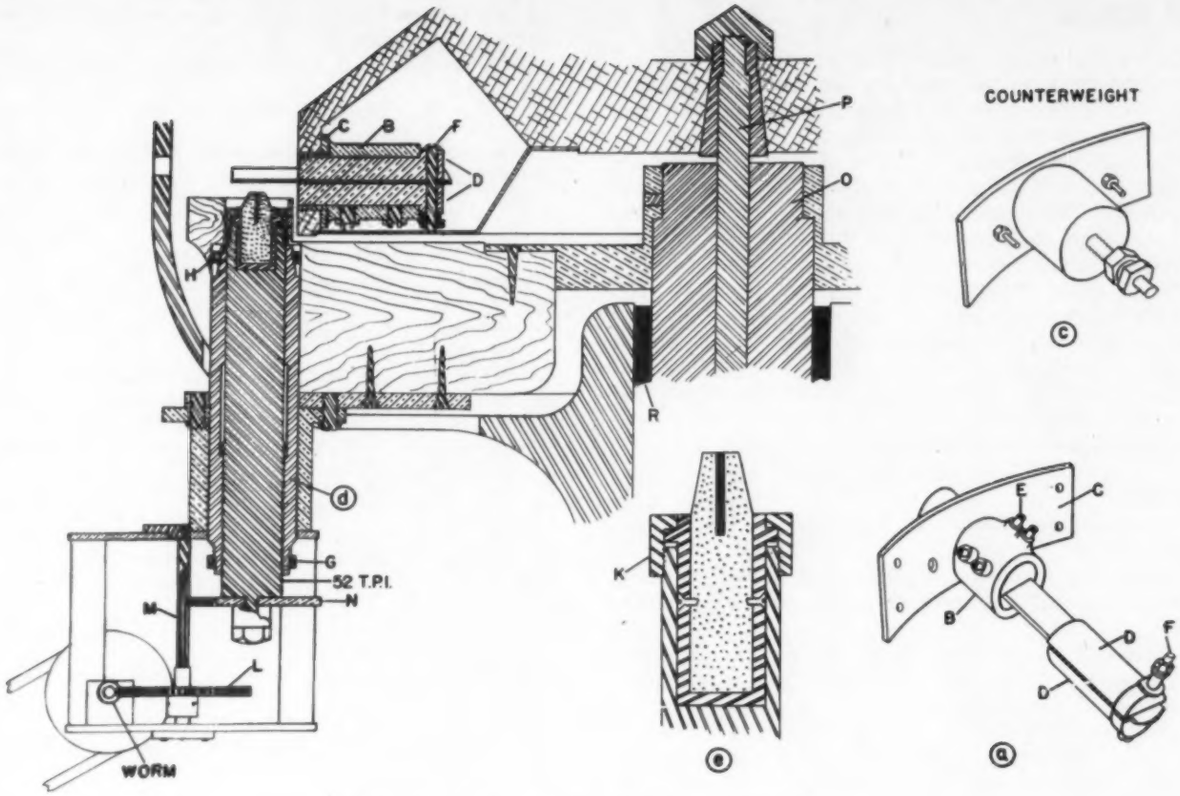

FIG. 2—Some details of the microtome.

Collection of Specimens

The collection of specimens was made convenient by the installation of a 4-inch pipe tangent to the centrifuge case at the impingement spot. Air from the centrifuge is pulled through an absorbent cotton filter held on a screen soldered in the elbow (E), Fig. 1. The collection of the specimens can be observed through the glass tube (T). An exhaust fan is used to supplement the wind created by the rapidly revolving head and knife. The elbow (K) is a safety precaution in case of accident.

Knife

The microtome knives available were found to be too soft for use at the high speed employed. Power hack saw blades sharpened to a knife angle of 40 degrees were found to be superior. Sharpening of the knife was done with a Schmid microtome knife sharpener *(16)*. This involves the use of Turkish emery and white rouge. In place of the final leather stropping usually employed in this method, honing with alumina was substituted.

Preparation of Specimens

A cylinder with tapered hole is placed on top of the holder shown in Fig. 2. Molten paraffin is poured into the holder to the top of the cylinder. When the paraffin has solidified, the tapered cylinder is removed, leaving the projecting paraffin block. A hole is made off-center in this block with a heated nail, the specimen inserted, and molten paraffin poured in. The top of the paraffin is kept melted with the hot nail while the paraffin below solidifies. This prevents formation of air pockets as the paraffin contracts. Rubber samples, after a normal hot press cure, were given a further sulfur chloride cure as described by Green *(13)*.

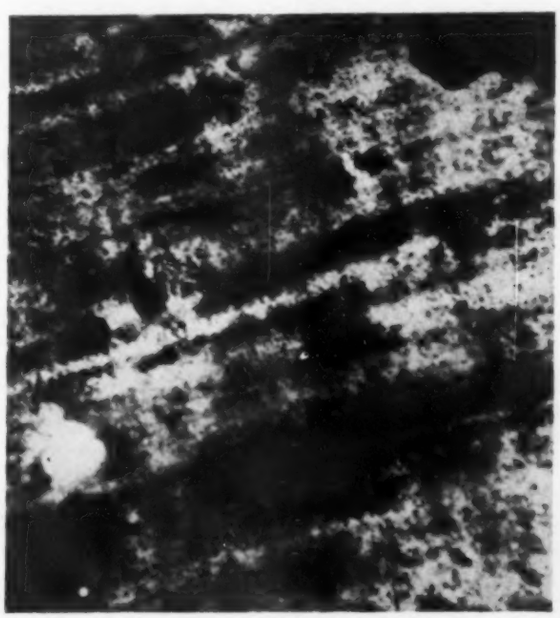

FIG. 3—Micronex W-6 in cured Hevea.

Use of Apparatus

Observation of the position and cutting of the specimen is observed by the use of a Strobotac and Strobolux. A ½-inch hole was drilled in the side of the case for this observation of the object. The use of the Strobotac is not necessary but is a convenience and was used in overcoming some of the difficulties encountered in the development of this microtome. Before the centrifuge is stopped, the specimen is always lowered. This is necessary because the head of the centrifuge generally rides at a higher level at top speed than it does at rest.

An electron photomicrograph of EPC carbon black in vulcanized Hevea is shown in Fig. 3. This attests to the effectiveness of the new microtoming technique. The slight streaking observed is due to small nicks remaining in the cutting blade.

Discussion

The advantages found in this type of microtome are as follows:

1. Excellent bearings, smooth drive, weight and safety protection are supplied by the use of a commercial centrifuge.
2. The type of head and knife installation not only gives a secure mount for the knife but allows easy adjustment of the cutting angle.
3. The specimen holder, due to its rotation, gives the effect of direct and oblique cutting at all angles. In addition, the mounting of the specimen off-center in the paraffin block, presents a new section of the cutting edge as the specimen slowly revolves.
4. Collection of specimens can be observed and is extremely convenient.
5. A minimum of special equipment was required.

ACKNOWLEDGMENT

Acknowledgment is made to W. B. Wiegand, Director of Research, for his encouragement and support in this project.

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Use of Neoprene-Coated Fiberglas in Commercial Airplanes

FOLLOWING tests of tear and tensile strength, dimensional stability, and general durability in use, Transcontinental & Western Air, Inc. (TWA) has adopted a neoprene-coated Fiberglas cloth as the supporting fabric for seats on all its commercially operated planes and for crew bunks on its C-54 passenger and cargo planes. It has also developed a steering gear dust boot of neoprene-coated Fiberglas cloth for all its planes.

The coated glass cloth was originally tried out as a supporting fabric for seats on a number of TWA's Stratoliner planes which were subsequently turned over to the Army and used as C-75 transports. These planes are now being returned to TWA and are being completely reoutfitted with seats in which the coated glass cloth is incorporated. The coated glass cloth crew bunks, two to each plane, have been installed in the entire fleet of C-54 planes operated by Transcontinental & Western Air.

The steering gear unit of TWA planes which is now protected by a coated glass cloth dust boot is a plunger-like device. The protective boot, therefore, must contract and expand like an accordion, with the movements of the plunger. All-rubber boots, originally used, wore out rather rapidly under the severe operating conditions, including constant flexing. Experience with the coated glass cloth boots shows that they give a minimum of 50 per cent more wear than the all-rubber boots.

Use of neoprene-coated Fiberglas cloth as the supporting fabric in horizontal and upright sections of passenger seats in TWA planes.

Naftolen MV in GR-S Tires

by WALTER H. GROTE[1] and FRITZ S. ROSTLER[2]

PLASTICIZER-EXTENDERS of the unsaturated hydrocarbon type, originally developed for natural rubber mixtures, have also proved to be very valuable and useful compounding ingredients for GR-S. The first products of this type were the various grades of Naftolen. Due to the versatility of these products, especially Naftolen R-100, they have been widely accepted by rubber compounders. Large quantities and large proportions have been and are being used in such opposite applications as footwear and hard rubber. The proportions used in practical compounding have been as high as 100 parts on 100 GR-S. Reliability in quality and consequent reproducibility of results make Naftolen an ingredient for many products made to government specifications.

Production of Unsaturated Hydrocarbon Extenders

The raw material for the production of Naftolen R-100 is acid sludge from the refining of lubricating oil. Four groups of hydrocarbon materials are isolated from this raw material and blended together in certain constant proportions. The nature of this raw material makes it difficult to handle on large scale and the production of Naftolen, being a five step process, makes it a product in a price range too high for use in a large volume, highly competitive field, such as the production of tires.

A raw material containing the same hydrocarbons which are the basis of Naftolen, but in somewhat different concentrations, is solvent extract from the refining of lubricating oils. Solvent extracts, being noncorrosive materials, and easy to handle at elevated temperatures, offered the possibility of producing unsaturated hydrocarbon extenders by an inexpensive method. After extensive investigation of a wide variety of solvent extracts, based on the experience gained from producing and compounding Naftolen, a raw material was found which gives a product of very similar properties, but only slightly less reactive.

Although not identical with the original Naftolens in composition, the blend of hydrocarbons which can be produced from solvent extracts is quite similar to the blends presently known as Naftolen, if the raw material used is carefully selected and the blending of the forementioned four groups of hydrocarbons is properly carried out. After the principle of this process was found the practical application was worked out in plant and laboratory tests carried out over a number of years. The production process was put into operation in close cooperation with a refinery in order to assure the careful control of the entire refining process, starting with selection of the crude oil, necessary for uniformity and purity of the finished product. The product resulting from this process is Naftolen MV. It is produced in one grade only on large scale production in a continuous process.

Production of Naftolen MV

The two main steps in the production of Naftolen MV, starting with an exactly specified raw material, are fractionation in vacuum and blending of the fractions according to standardized specifications. The specification for Naftolen MV to be a completely vacuum distilled product has been found to be indispensable if a dependable product is to be assured. Certain impurities, such as naphthenates and copper-containing compounds, if not completely removed by vacuum distillation, can offset in one day the savings gained over a long period of time by using a cheaper but less strictly controlled product. The danger of the two impurities mentioned is obvious. However, even such a harmless-appearing impurity as moisture in a compounding ingredient can be responsible for failure of tires on the road. This is especially true for carcass failures where the fabric, cotton and rayon, which are highly absorbent, can take on moisture from the stock and retain it in the finished tire.

The fact that Naftolen MV is a standardized product with strictly controlled properties based on many years' experience cannot be over-rated. The use of unsaturated hydrocarbons in compounding GR-S is relatively new[3] and the exact interdependence of their

TABLE I

	1	2	3
GR-S	100.	100.	100.
Sulfur	1.80	3.00	3.00
Stearic Acid	0.50	0.50	0.50
Naftolen MV	.....	40.	40.
Zinc Oxide	5.	5.0	5.0
Standard Micronex	45.	77.	55.
Altax	1.50	1.50	1.50
D.P.G.	0.25	0.25	0.25
Scott Plasticity, 212° F., 15 lbs.	110	140	220
Optimum Cure at 45 lbs.	65′	65′	65′
Shore Hardness	59	59	52
300% Modulus	1260	780	560
500% Modulus	2700	1660	1400
Tensile at Break	2850	2370	2050
Elongation at Break	520	630	610
Set at Break	19	41	25
Crescent Tear—Lengthwise	320	330	330
Crosswise	370	350	290

Note: Naftolen MV is a product of the Wilmington Chemical Corp., Wilmington, Delaware.

(1) Midwestern representative, Wilmington Chemical Corp.

(2) Formerly chief chemist, Wilmington Chemical Corp.; now Research Professor of Chemistry, Engineering Experiment Station, University of Delaware, Newark, Delaware.

(3) Rostler and Mehner, Naftolen—A New Compounding Material for Rubber, *I.R.W.*, Vol. 104, p. 47 (Aug., 1941).

TABLE II

	4	5
GR-S	100.	100.
Sulfur	2.00	2.40
Stearic Acid	0.50	0.50
Naftolen MV	.....	20.
Zinc Oxide	3.0	3.0
Kosmos 40	12.	17.
Standard Micronex	15.	21.
Suprex Clay	8.	11.
Santoflex B	2.0	2.0
Santocure	1.20	1.20
Scott Plasticity, 212° F., 15 lbs.	180	270
Optimum Cure at 45 lbs.	65'	65'
Shore Hardness	47	45
300% Modulus	620	460
500% Modulus	1700	1150
Tensile at Break	2150	2070
Elongation at Break	550	680
Set at Break	20	29
Crescent Tear—Lengthwise	170	210
Crosswise	180	200

chemical composition and compounding characteristics is not sufficiently well established to predict the effect of any variation in composition. Strictly controlled chemical and physical properties are therefore the only assurance of the reproducible compounding properties of prime importance for mass production, where variations in rate of cure, for instance, or in sulfur demand, can mean tremendous losses.

Chemical and Physical Properties

Naftolen MV is an unsaturated hydrocarbon composition of viscous honey-like consistency. Its unsaturation is designed to have the same sulfur demand as GR-S. Its low volatility and chemical stability insure safe handling and excellent storage properties. It is highly soluble in GR-S, natural rubber and reclaim.

According to the tests commonly used to identify petroleum products, Naftolen MV has the following analytical characteristics:

Volatility—Less than 0.1% boiling below 160°C. at 10 mm. Hg.

Specific Gravity—1.02 to 1.04.

Viscosity at 25°C.—20,000 to 150,000 centipoises. At 98°C.—25 to 50 centipoises.

pH—7

Iodine Number—40 to 50 (Huebl, 24 hours).

Flash Point (Open Cup)—400°F. minimum.

Aniline Point— Below freezing point of aniline.

Ash—None.

Color—Reddish-brown with green fluorescence, transparent in thin layers.

Average Molecular Weight—350 to 400.

General Processing Characteristics

Naftolen MV is compatible with GR-S in all proportions. It functions as a solvent and swelling agent for GR-S, resulting in lower power consumption during milling, easier filler incorporation, and increased compatibility with other rubber hydrocarbons such as natural rubber and reclaim. Compounds containing Naftolen MV extrude smoothly, calender well and retain building tack on storage.

Naftolen MV also functions as a compounding buffer for the sulfur demand, and equalizes variation in rubber hydrocarbons. It flattens the cure, preventing overcure and undue aging. The solvent power of Naftolen MV for both sulfur and rubber promotes the vulcanization reaction, according to the well-known chemical rule that reactions proceed better in solution than in the dry state, neutralizes the effect of free sulfur in the vulcanized product, and tends to prevent blooming and adverse aging effects usually associated with an overdose of sulfur.

Incorporation into Compounds

The incorporation of Naftolen MV into GR-S can be carried out on either mill or internal mixer immediately after breakdown of the GR-S. The processing characteristics resulting from its use are most advantageously brought out if the batch of GR-S with Naftolen MV is allowed to rest for a minimum period of 24 hours before incorporating fillers and other compounding ingredients. In some production cycles it will prove convenient to use a concentrated Naftolen MV masterbatch (containing 20 to 50% Naftolen MV) and to incorporate this masterbatch into GR-S instead of the incorporation of Naftolen MV directly. The use of such masterbatches is the most effective way to utilize the swelling characteristics of Naftolen MV. Masterbatches containing high amounts of Naftolen MV (50:50 mixtures) which have been stored for a few months are very effective tackifiers.

Tests on building tires in regular plant production from stocks containing Naftolen MV have shown that the penetration of carcass and breaker stocks into the

TABLE III

	6	7	8
GR-S	100.	100.	100.
Sulfur	3.00	2.55	3.65
Stearic Acid	0.50	0.50	0.50
Naftolen R-100	5.	30.	30.
Zinc Oxide	3.0	3.0	3.0
Micronex W6	24.	30.	30.
Captax	1.25	1.25	1.25
D.P.G.	0.15	0.15	0.15
Scott Plasticity, 212° F., 15 lbs.	245	325	310
Optimum Cure at 40 lbs.	40'	60'	60'
Shore Hardness	48	37	44
(Aged 7 Days Geer Oven)	*(57)*	*(49)*	*(54)*
300% Modulus	650	260	500
500% Modulus	.....	720	.....
Tensile at Break	1190	1000	1130
(Aged 7 Days Geer Oven)	*(950)*	*(1350)*	*(1020)*
Elongation at Break	410	500	470
(Aged 7 Days Geer Oven)	*(270)*	*(480)*	*(340)*
Set at Break	6	8	10
Luepke Resilience—1st Impact	72	64	68
4th Impact	28	18	22
Crescent Tear—Lengthwise	120	120	130
Crosswise	100	120	100
Goodrich Flexometer Tests:			
Total Rise in °C.	38	89	36
Av. Rise, 10 min. in °C.	3.8	8.0	3.6
Schopper Detrition Test:			
Temperature after 500 Revs. °F.	330	310	270*
Temperature before Bursting	330	320	265–270
Revolutions until Bursting	957	650	3136
Total Temperature Rise °F.	248	238	183

* 1200 Revolutions.

fabric is greatly improved by the use of combinations of Naftolen MV and hydrogenated rosin-type plasticizers.

The incorporation of Naftolen MV into GR-S is simple, and follows the usual mixing practice. As to sequence of incorporation, the following order was found to be very satisfactory in general usage: (1) GR-S; (2) Sulfur (during the latter part of the breakdown); (3) Reclaim or other rubber hydrocarbons; (4) Stearic acid; (5) Naftolen MV (straight or in form of masterbatch) up to 15 parts on 100 GR-S; (6) Zinc oxide; (7) Fillers; (8) Remainder of Naftolen MV (straight or in form of masterbatch); (9) Antioxidants, etc., and (10) Accelerators.

General Rules for Compounding

It is common practice in setting up new formulations to utilize past experience, and to start from a compound with which the compounder is familiar or which is more or less standard for its particular application. This holds true especially in tire compounding where reliable and proven recipes are in use in every company. When adding Naftolen MV as a compounding ingredient to a given compound two main points have to be considered: first, that it is an unsaturated hydrocarbon composition extending the rubber hydrocarbon basis which calls for additional sulfur; and, second, that it is much softer than GR-S, which calls for an increase in filler content commensurate with this softening effect.

The importance of this proper filler adjustment is demonstrated by the three compounds shown in Table I. Compound 1 is the starting formula. Compound 2 contains a high amount of Naftolen MV and an adequate amount of an active black. Compound 3 contains the same amount of Naftolen MV, but has insufficient filler adjustment.

As a general guide in setting up compounds with Naftolen MV based on a formula on hand, the following simple method can be used and will give a compound with properties close to those wanted. Only minor adjustments will then be necessary to bring the compound in line. In accordance with the two main requirements mentioned before, the basic changes to be made are appropriate increase of sulfur and filler:

Sulfur—from the percentage used on rubber hydrocarbons to the same percentage on total hydrocarbons (rubber hydrocarbons plus Naftolen MV),

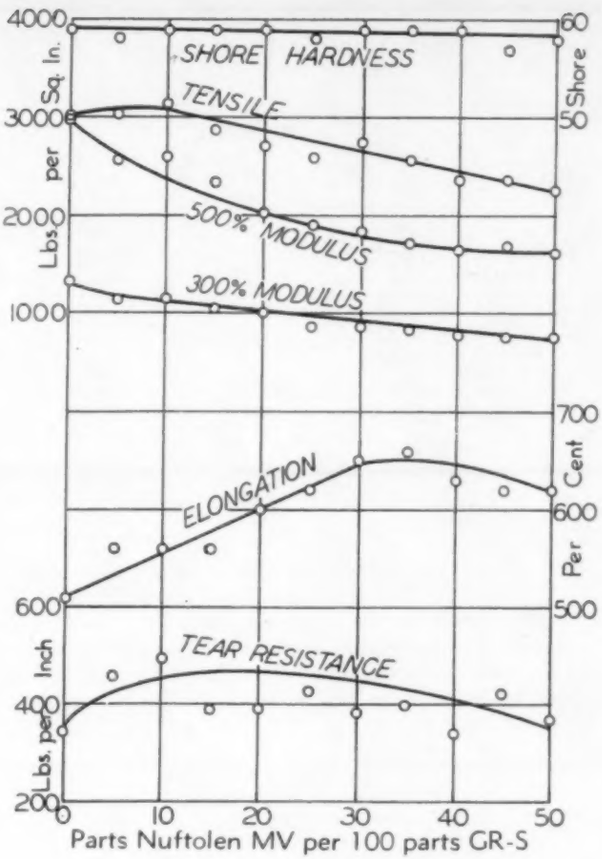


FIG. 1

TABLE IV

	9	10	11	12	13	14	15	16	17	18	19
GR-S	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.	100.
Sulfur	1.80	1.95	2.10	2.25	2.40	2.55	2.70	2.85	3.00	3.15	3.30
Stearic Acid	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Naftolen MV	.....	5.	10.	15.	20.	25.	30.	35.	40.	45.	50.
Zinc Oxide	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Standard Micronex	45.	49.	53.	57.	61.	65.	69.	73.	77.	81.	85.
Altax	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
D.P.G.	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Optimum Cure at 45 lbs.	65′	65′	65′	65′	65′	65′	65′	65′	65′	65′	65′
Specific Gravity	1.175	1.165	1.185	1.185	1.195	1.200	1.200	1.205	1.205	1.215	1.205
Shore Hardness	59	58	59	59	59	58	59	59	59	57	58
(Aged 7 Days—Geer Oven)	*(66)*	*(65)*	*(65)*	*(66)*	*(67)*	*(66)*	*(69)*	*(68)*	*(68)*	*(68)*	*(66)*
300% Modulus	1260	1150	1140	1050	1010	850	860	820	780	760	740
500% Modulus	2750	2550	2600	2330	2020	1900	1840	1720	1660	1690	1620
Tensile at Break	2890	3030	3150	2870	2700	2590	2750	2570	2370	2370	2270
(Aged 7 Days—Geer Oven)	*(2810)*	*(2680)*	*(2590)*	*(2330)*	*(2680)*	*(2510)*	*(2430)*	*(2540)*	*(2350)*	*(2330)*	*(2250)*
Elongation at Break	520	560	560	560	600	620	650	660	630	620	620
(Aged 7 Days—Geer Oven)	*(340)*	*(380)*	*(390)*	*(400)*	*(460)*	*(450)*	*(450)*	*(500)*	*(430)*	*(470)*	*(450)*
Set at Break	19	21	20	22	27	30	37	43	41	43	45
Crescent Tear—Lengthwise	320	470	490	360	420	470	340	370	330	390	360
Crosswise	370	450	500	420	360	440	430	420	350	460	380

TABLE V—SEMI-HARD RUBBER

	20	21	22	23
GR-S	100.	100.	100.	100.
Sulfur	15.	20.	25.	30.
Stearic Acid	0.50	0.50	0.50	0.50
Naftolen MV	35.	35.	35.	35.
Zinc Oxide	5.0	5.0	5.0	5.0
Pelletex	100.	100.	100.	100.
Litharge	4.0	4.0	4.0	4.0
Altax	1.50	1.50	1.50	1.50
D.P.G.	0.25	0.25	0.25	0.25
Scott Plasticity, 212° F., 15 lbs.	270	275	270	275
Flat Cure 45# Starts at	35′	35′	35′	35′
Optimum Cure at 45#	65′	65′	65′	65′
Specific Gravity	1.295	1.305	1.315	1.325
Shore Hardness-A Durometer	84	86	87	88
(Oven Aged 24 hrs. 100° C.)	*(86)*	*(87)*	*(90)*	*(92)*
Shore Hardness-D Durometer	34	35	39	40
Tensile at Break	2380	2430	2890	2970
(Oven Aged 24 hrs. 100° C.)	*(2080)*	*(2300)*	*(2420)*	*(2300)*
Elongation at Break	90	90	70	70
(Oven Aged 24 hrs. 100° C.)	*(70)*	*(50)*	*(50)*	*(40)*
Set at Break	5	4	5	4

Filler—from the percentage used on the rubber hydrocarbons to this original percentage plus twice this percentage on the Naftolen MV.

An illustration of this method of formulating follows on a carcass compound in which building tack and calendering have to be improved. The compound has a basic skeleton of:

100 parts GR-S
2 parts Sulfur
12 parts HMF Black
15 parts MPC Black
8 parts Hard Clay

If it is desired to add 20 parts of Naftolen MV on 100 parts rubber hydrocarbons, the following additions would have to be made to the sulfur and fillers:

Sulfur —0.40 parts (2% of 20)
HMF Black—4.8 parts (2 × 12% = 24% of 20)
MPC Black—6.0 parts (2 × 15% = 30% of 20)
Hard Clay—3.2 parts (2 × 8% = 16% of 20)

The resulting basic skeleton for the compound containing Naftolen MV would then be:

100 parts GR-S
20 parts Naftolen MV
2.4 parts Sulfur
17 parts HMF Black (rounded off from 16.8)
21 parts MPC Black
11 parts Hard Clay (rounded off from 11.2)

Other ingredients, for the most part, need not be altered with the addition of Naftolen MV. This method of compounding will give a formula not far off the best balanced composition. Two compounds are shown in Table II, the starting compound, and the compound containing Naftolen MV, set up as explained above, with their physical data. As can be seen, the two compounds are very similar in their physical properties, except in plasticity and modulus.

This method of adjusting has to be looked upon as a rule of thumb in order to achieve a formula with approximately the correct proportions. Following this rule of thumb for the filler adjustment tends to give somewhat lower hardness than the original compound with non-reinforcing or semi-reinforcing fillers, and somewhat higher hardness with channel blacks. In tire compounds using channel black as the only or principal filler, a closer adjustment of the channel black content can be achieved by using 80% channel black on the Naftolen MV in addition to the black used on the GR-S.

Hardness with Varying Amounts

The series of compounds given in Table IV illustrates how, using this rule, compounds of the same hardness can be obtained with any amount of Naftolen MV up to 50 parts. The physical data of this series of compounds are graphically shown in Fig. 1. In this series a closer method of sulfur adjustment is also used, which is applicable to compounds with the Altax-D.P.G. acceleration used in the series. In addition to the sulfur used on the GR-S in the base compound, 3% is used on the Naftolen MV. However, when using 2% sulfur on the total hydrocarbons as suggested in the rule of thumb method, the results would not be much altered.

TABLE VI—TREAD STOCKS

	24	25	26	27	28
GR-S	100.	100.	100.	100.	100.
Sulfur	2.00	2.15	2.25	2.50	2.80
Stearic Acid	0.50	0.50	0.50	0.50	0.50
Naftolen MV	.....	8.	12.	25.	40.
Zinc Oxide	3.0	3.0	3.0	3.0	3.0
Standard Micronex	40.	46.	50.	60.	72.
Suprex Clay	10.	12.	12.	15.	18.
Santoflex B	2.0	2.0	2.0	2.0	2.0
Heliozone	3.0	3.0	3.0	3.0	3.0
Santocure	1.50	1.50	1.50	1.50	1.50
Scott Plasticity, 212° F., 15 lbs.	190	210	210	190	205
Flat Cure 45# Starts at	35′	35′	35′	35′	35′
Optimum Cure at 45#	65′	50′	65′	65′	65′
Specific Gravity	1.155	1.175	1.175	1.215	1.215
Shore Hardness	54	54	54	53	52
(Oven Aged 24 hrs. 100° C.)	*(66)*	*(66)*	*(66)*	*(66)*	*(66)*
300% Modulus	1100	800	770	700	570
500% Modulus	2500	2000	1850	1630	1370
Tensile at Break	2800	2800	2680	2520	2140
(Oven Aged 24 hrs. 100° C.)	*(2200)*	*(2220)*	*(2340)*	*(2530)*	*(2290)*
Elongation at Break	540	600	620	650	670
(Oven Aged 24 hrs. 100° C.)	*(360)*	*(370)*	*(400)*	*(480)*	*(480)*
Set at Break	21	27	32	42	55
Abrasion	200	210	200	220	230
Luepke Resilience—1st Impact.	59	57	55	52	47
4th Impact.	15	13	11	8	6
Crescent Tear—Lengthwise	370	530	430	340	460
Crosswise	370	540	340	360	370

TABLE VII—BREAKER STOCKS

	29	30	31	32	33
GR-S	100.	100.	100.	100.	100.
Sulfur	1.80	2.00	2.00	2.00	2.30
Stearic Acid	0.50	0.50	0.50	0.50	0.50
Naftolen MV	.....	10.	10.	10.	30.
Contogum 30	.....	.....	5.0	.....	.....
Staybelite	.....	.....	.....	3.0	.....
Zinc Oxide	3.0	3.0	3.0	3.0	3.0
Kosmos 40	25.	30.	30.	30.	40.
Standard Micronex	10.	12.	12.	12.	16.
Suprex Clay	8.	10.	10.	10.	13.
Santoflex B	2.0	2.0	2.0	2.0	2.0
Santocure	1.50	1.50	1.50	1.50	1.50
Scott Plasticity, 212° F., 15 lbs.	190	225	230	215	265
Flat Cure 45# Starts at	35′	35′	35′	50′	35′
Optimum Cure at 45#	65′	65′	65′	65′	65′
Specific Gravity	1.155	1.175	1.165	1.165	1.195
Shore Hardness	49	47	46	49	45
(Oven Aged 24 hrs. 100° C.)	*(58)*	*(58)*	*(55)*	*(55)*	*(53)*
300% Modulus	1000	910	480	650	710
500% Modulus	....	1990	1190	1640	1470
Tensile at Break	2170	2300	2520	2620	2110
(Oven Aged 24 hrs. 100° C.)	*(1670)*	*(1910)*	*(2180)*	*(2260)*	*(1940)*
Elongation at Break	480	560	740	670	650
(Oven Aged 24 hrs. 100° C.)	*(340)*	*(410)*	*(520)*	*(460)*	*(520)*
Set at Break	11	18	21	34	31
Luepke Resilience—1st Impact.	65	64	64	63	58
4th Impact.	21	18	18	17	12

TABLE VIII—CARCASS STOCKS

	34	35	36	37	38	39	40	41
GR-S	100.	100.	100.	100.	100.	85.	85.	85.
Sulfur	2.00	2.20	2.40	2.40	2.60	2.20	2.20	2.20
Reclaim M-112	.....	.....	.....	.....	.....	30.	30.	30.
Stearic Acid	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Naftolen MV	.....	10.	20.	20.	30.	10.	10.	10.
Contogum 30	.....	.....	.....	.....	.....	.....	3.0	.....
Staybelite	.....	.....	.....	3.0	.....	.....	.....	3.0
Zinc Oxide	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Kosmos 40	12.	14.	17.	17.	19.	14.	14.	14.
Standard Micronex	15.	18.	21.	21.	24.	18.	18.	18.
Suprex Clay	8.	10.	11.	11.	13.	10.	10.	10.
Santoflex B	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Santocure	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
Scott Plasticity, 212° F., 15 lbs.	180	230	270	270	260	210	210	240
Flat Cure 45# Starts at	35′	35′	35′	50′	35′	35′	40′	45′
Optimum Cure at 45#	65′	65′	65′	65′	65′	65′	50′	65′
Specific Gravity	1.135	1.145	1.145	1.150	1.165	1.165	1.165	1.165
Shore Hardness	47	46	45	46	43	49	47	50
(Oven Aged 24 hrs. 100° C.)	*(56)*	*(55)*	*(53)*	*(53)*	*(51)*	*(56)*	*(56)*	*(55)*
300% Modulus	620	540	460	500	430	580	450	530
500% Modulus	1700	1380	1150	1300	1060	1370	1040	1320
Tensile at Break	2150	2070	2070	2130	1890	1840	1960	2020
(Oven Aged 24 hrs. 100° C.)	*(1830)*	*(2160)*	*(1940)*	*(1930)*	*(1860)*	*(1710)*	*(1740)*	*(1890)*
Elongation at Break	550	680	380	650	680	600	710	630
(Oven Aged 24 hrs. 100° C.)	*(480)*	*(500)*	*(530)*	*(450)*	*(530)*	*(470)*	*(480)*	*(460)*
Set at Break	20	19	29	20	32	26	34	28
Luepke Resilience—1st Impact	67	64	61	62	59	64	63	63
4th Impact	23	19	14	15	12	17	17	18
Crescent Tear—Lengthwise	170	280	210	200	240	280	290	280
Crosswise	180	310	200	170	260	260	290	280

Upward sulfur adjustment is important where a low figure for heat build up is desired as measured with the Goodrich Flexometer or the Schopper Detrition Machine. The influence of sulfur on this value is demonstrated by the three carcass compounds shown in Table III. Compound 6 is the starting formula. Compounds 7 and 8 contain Naftolen R-100 which is somewhat more sensitive to the sulfur demand than Naftolen MV.

An interesting application of Naftolen MV is in semi-hard rubber stocks. Stocks of this hardness range can be used in bead stocks and similar compounds where the combination of properties of high plasticity of the uncured stock with high hardness and low elongation of the cured stock is desired. It is noteworthy that these stocks containing GR-S and Naftolen MV have, contrary to natural rubber stocks, excellent aging properties in spite of the medium sulfur range. Examples of four stocks in this hardness range, from 34 to 40, D Durometer (84 to 88, A Durometer), are given in Table V.

Amounts of Naftolen MV to Be Used

The behavior of Naftolen MV in GR-S tire compounds and its function depend on the amounts used. The effect of Naftolen MV in three ranges of concentration considered practical for tire compounding is discussed below:

(A) *Use of Naftolen MV in Small Amounts* (8 to 12 parts on 100 parts GR-S)—The use of Naftolen MV in this range brings about a considerable improvement in physical properties of finished compounds and facilitates processing, especially tubing. Even as little as 8 parts of Naftolen MV on 100 GR-S effects excellent carbon black dispersion, thus improving stress-strain properties and resistance to tear, and gives enough swelling of the rubber hydrocarbon to improve tubing characteristics. Building tack is also improved, especially if the stearic acid content is kept at a minimum (0.5 parts stearic acid on 100 GR-S is recommended).

A minimum of 8 parts and a maximum of 12 parts of Naftolen MV on 100 GR-S is the recommended amount for high grade tread compounds. (Practical examples: Table VI, Compound 25; Table VII, Compound 31; Table VIII, Compounds 40 and 41).

(B) *Use of Naftolen MV in Medium Amounts* (15 to 30 parts on 100 GR-S)—Compounds containing Naftolen MV in this range give vulcanizates of practically the same physical properties as a control compound without Naftolen MV, if the filler and sulfur are adjusted to give products of equal hardness. However, the stocks containing Naftolen MV are easier to handle, and calender and extrude better than the stocks without it. Naftolen MV used in this concentration activates the vulcanization, which sometimes requires reduction in acceleration.

The use of Naftolen MV in this range is recommended for high grade carcass and breaker stocks, inner tubes, camelback, and second grade treads. Stocks with medium to high amounts make excellent camelback stocks which retain their building tack and laminating properties for a practically indefinite length of time. (Practical examples: Table VII, Compound 33; Table VIII, Compound 37; Table X, Compound 45).

(C) *Use of Naftolen MV in Large Amounts* (30 to 50 parts on 100 GR-S)—When Naftolen MV is used in these amounts it serves as an extender for the GR-S,

permitting the use of large amounts of filler resulting in a considerable reduction in cost. With proper filler adjustment, compounds can be obtained with only small sacrifice in physical properties. Stocks of high plasticity, good tubing properties and excellent building tack are obtained. Stocks containing this high amount lend themselves especially well for mass production of third grade tires and fast operations.

Such stocks are feasible for third grade treads, carcass and breaker stocks, for inner tubes and for camelback. (Practical examples: Table IV, Compound 19; Table VI, Compound 28). Interesting bead stocks can also be obtained with Naftolen MV used in this or the medium range of concentration. (Practical example: Table IX, Compound 43).

Examples of Compounds

In Table VI to X are reported examples of stocks compounded with Naftolen MV in accordance with the principles set forth above.

In Table VI are given tread stocks illustrating the use of Naftolen MV in each of the three ranges of concentration discussed. Compound 24 is a reference stock without Naftolen MV.

In Table VII are examples of breaker stocks. Compound 29 is again a reference stock without Naftolen MV. Compounds 30, 31 and 32 are examples of the use of Naftolen MV in the lower range of concentration—in 30, alone, and in 31 and 32, in combination with two hydrogenated rosin-type plasticizers. Compound 33 illustrates the use of Naftolen MV in high concentration.

In Table VIII are illustrated GR-S carcass stocks using Naftolen MV in low, medium and high concentration ranges (Compounds 35, 36 and 38). Compound 34 is a reference stock, and Compound 37 contains Naftolen MV in combination with a hydrogenated rosin-type plasticizer. Compounds 39, 40 and 41 are examples of the use of Naftolen MV in a GR-S carcass stock containing reclaim—in 39, alone, and in 40 and 41, in combination with a hydrogenated rosin-type plasticizer.

In Table IX are given two bead stocks, one containing SRF black and Naftolen MV incorporated separately, and the other containing these two ingredients incorporated in the form of Naftex SRF 75. The advantage of incorporating the two ingredients in this form is obvious from the figures given for mixing time of the two stocks.

In Table X are given two examples of inner tube stocks containing Naftolen MV, in a low and in a high range.

TABLE IX—BEAD STOCKS

	42	43
GR-S	100.	100.
Sulfur	20.	20.
Naftolen MV	35.	.....
Pelletex	100.	.....
Naftex SRF 75	.....	140.
Zinc Oxide	5.0	5.0
Litharge	4.0	4.0
Altax	1.50	1.50
D.P.G.	0.25	0.25
A-10	0.10	0.10
Scott Plasticity, 212° F., 15 lbs.	240	250
Flat Cure 45# Starts at	50′	35′
Optimum Cure at 45#	65′	65′
Specific Gravity	1.305	1.295
Shore Hardness—A Durometer	88	87
(Oven Aged 24 hrs. 100° C.)	*(93)*	*(92)*
Shore Hardness—D Durometer	41	38
(Oven Aged 24 hrs. 100° C.)	*(51)*	*(48)*
Tensile at Break	2260	2350
(Oven Aged 24 hrs. 100° C.)	*(2260)*	*(2180)*
Elongation at Break	100	100
(Oven Aged 24 hrs. 100° C.)	*(70)*	*(80)*
Mixing Time	25′	17′

TABLE X—INNER TUBE STOCKS

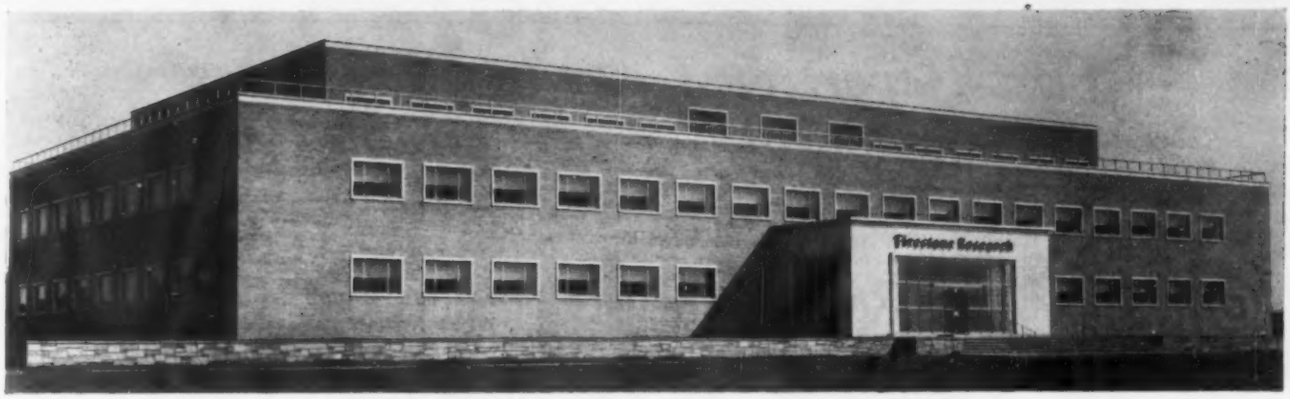
	44	45
GR-S	100.	100.
Sulfur	2.20	2.60
Stearic Acid	0.50	0.50
Naftolen MV	10.	30.
Zinc Oxide	3.0	3.0
Kosmos 40	36.	48.
Standard Micronex	12.	16.
Suprex Clay	7.	10.
Santoflex B.	2.0	2.0
Heliozone	3.0	3.0
Santocure	1.20	1.20
Scott Plasticity, 212° F., 15 lbs.	235	250
Flat Cure 45# Starts at	35′	35′
Optimum Cure at 45#	65′	65′
Specific Gravity	1.175	1.205
Shore Hardness	49	46
(Oven Aged 24 hrs. 100° C.)	*(56)*	*(55)*
300% Modulus	900	760
500% Modulus	1810	1550
Tensile at Break	2290	2000
(Oven Aged 24 hrs. 100° C.)	*(2100)*	*(2050)*
Elongation at Break	580	580
(Oven Aged 24 hrs. 100° C.)	*(450)*	*(500)*
Set at Break	23	29
Crescent Tear—Lengthwise	310	290
Crosswise	290	310

Summary

The purpose of this article is to aid compounders using Naftolen MV by making available basic compounding information which has been collected in extensive tests. Some of the compounds have been tested in the production of tires on a factory scale and have been found to confirm the laboratory findings. For instance, tires built from Compounds 25 in Table VI (tread), 31 in Table VII (breaker), and 40 in Table VIII (carcass) appear to be of excellent quality.

The information contained in this article is believed to be of value in that it gives a general orientation and will shorten the preliminary experimental work of the compounder interested in these types of compounds, but does not eliminate the necessity of working out the specific compounding problems which are inherent in every new compound designed for practical use.

The principles of compounding with Naftolen MV have been set forth in this article using GR-S as principal rubber hydrocarbons. Naftolen MV, however, is equally suitable for natural rubber tires or for combination tires containing mixtures of rubber hydrocarbons.



Firestone's New Research Laboratory

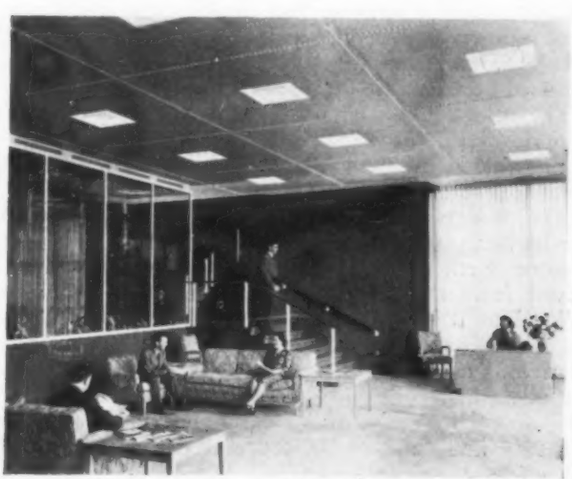
THE new research laboratory of the Firestone Tire and Rubber Co. at Akron, Ohio, built at a cost in excess of $2,000,000, was recently completed. It is said to be one of the largest and best equipped laboratories for rubber, plastics, metal and textile research. Three stories in height, of buff brick construction, the laboratory is fully air-conditioned, and is located on a 20-acre plot high on a hill overlooking the Firestone plants. It has approximately 100,000 square feet of floor space.

The laboratory has prefabricated steel inner walls and partitions which can be moved to completely rearrange the interior of the building. Scientists work in two, four and six-man laboratories, but the larger laboratories can be revised if desired. A six-man laboratory, for example, could be divided into one four-man and one two-man laboratory, or into three two-man laboratories. The fixtures in the laboratories also can be rearranged to meet the varying needs of the researchers.

Service units provide facilities for hot, cold and distilled water, for steam, gas, vacuum, compressed air and a wide range of alternating and direct electrical currents. Constant temperature and humidity control has been arranged for an infra-red room, an electrical measurements room and a physical testing room. There is a large library. An aging laboratory on the roof is used to check the effect of the weather on materials and products.

An electron-microscope that magnifies up to 100,000 times compared with 2000 for an ordinary microscope is one of the important large instruments available to the scientists. An X-ray diffraction machine can be used in studying the crystalline structure of rubber and other materials. A quartz spectrograph and an infrared spectrograph speed analyses. One of the departments of the new laboratory is an experimental mill and curing room where rubber is compounded, mixed and vulcanized on a miniature scale. Another innovation is a machine shop where Firestone research men build special scientific instruments they have designed.

Instruments developed by Firestone scientists and installed in the laboratory include: a forced vibrator for determining the properties of rubber in motion; a plastometer for measuring the processibility of rubbers and rubber-like materials; a relaxometer to study the effect of heat and oxygen on stretched rubber; and a low temperature modulus test apparatus for determining the physical properties of materials at temperatures down to 100°F.



Lobby of the Firestone laboratory.

One of the six-man laboratories.

Summary Report on the Production and Performance of German Synthetic Tires and Other Transportation Items

Part II

THE latest tire compound recipes of Continental, Phoenix and Dunlop are shown in Tables IV, V and VI. In addition to this compound data, formula information on compounds used for tread cements, for rayon dipping, and for doughing, are included in the later discussions of these operations.

A number of photostat copies of tire construction specifications were obtained, and these are reproduced in Tables VII and VIII. These were from the central development laboratories at Leverkusen, where it is stated that approximately 150 tires per day were being made. Full compound and construction information apparently was furnished to Leverkusen by all German tire manufacturers. It can be assumed, therefore, that these construction sheets are typical of general industry practices.

Data on three sizes are given: 5.50-16 Passenger Tires; 7.25-20 Traction Type Truck Tires; and 9.75-20 Highway Truck Tires. The 8-ply 7.25-20 tire is comparable to the 10-ply 32 x 6 although slightly smaller in dimensions than the American tire. The 7.25-20 and 190 x 20 accounted for a large proportion of German truck tire production.

The 9.75-20 10-ply was the largest size made in any quantity, although a few were produced up to the 16-ply 13.50-20 size. Indications were that the 9.75 tire of 100% synthetic left much to be desired. The many large size tires on American equipment were a source of amazement to the Germans.

Heat Softening

Except for a few special purposes raw Buna as received from the polymerization plants cannot be processed prior to a partial depolymerization or "heat-softening" operation. Even after this heat softening, larger percentages of softeners are necessary in German compounds than is customary in American practice.

The heat softening is performed at the processing factories rather than the polymerization plants, because the softened Buna tends to regain nerve on standing. This makes it desirable to use the treated material relatively soon after the softening operation. Opinions and practices varied somewhat as to the maximum length of permissible storage time before compounding. Some indicated that if Buna was not used within 24 hours it required retreatment. Others felt it could be stored for several days to a week. It was stated that this hardening can be retarded by the addition of 0.5% formaldehyde or by 1 to 3% paraformaldehyde toluidine. These were seldom used in practice due to ill effects on workmen.

As received, Bunas have Defo plasticities of 3000 and upward and this Defo must be reduced usually to values of 300 to 1000. The requirements for this breakdown are a large surface area for the Buna and a fixed temperature of the order of 125° to 150° C., with circulating air or air pressure. Open steam heating is not used because it is detrimental.

The investigators obtained information at each target on several modifications of treating methods and equipment. They will not be described fully here, but the information is on file if details are desired.

The process is sometimes carried out batchwise, but for higher production capacities and lower costs continuous methods were employed. The Buna is received from the polymerization plants in sheet form, rolled into 100 Kg packages. In the continuous process the Buna is sometimes shredded but more often carried as a sheet on a conveyor through a circulating air oven at a controlled temperature of the order of 135° C. The degree of softening depends on the temperature and time of exposure, the time being controlled by conveyor speeds.

Continuous oven processes are limited to softening Buna to a Defo from 500 to 700. For a greater degree

of softening the more costly batchwise autoclave method is used. In this simple process the Buna sheet is cut into strips or shredded by means of a lawnmower type cutter. These strips are piled on trays in the heater and treated for from 30 to 45 minutes at a predetermined fixed temperature of 125° to 150° C. depending on the softening required. The air in the heater is under a pressure of 4 to 5 atmospheres.

The actual times and temperatures of heating obviously depend on the plasticity of the particular lot of raw Buna used and on the degree of softening required. There apparently was considerable variation in plasticity of the Buna as received both from a given plant and from plant to plant. Adjustments in heat treating conditions, based on raw plasticity, did not necessarily produce Buna of uniform Defo. For this reason, in addition to checking and classifying the Buna as it was received, plasticity measurements were obtained on the treated rubber which was then put into various classifications.

It will be noted in several formulae in this report that Bunas of different Defo values were used in the same mixing. Some of the German technical men were firmly of the opinion that extrusion and calendering characteristics of a blend of tough and soft Bunas were much better than if all the Buna in the stock had been heat-softened to a uniform intermediate Defo value.

The I. G. had experimental work under way with Renacit (thio beta naphthol) as a mastication accelerator for Buna S to take the place of heat softening. There were no indications of imminent acceptance by the industry.

TABLE IV—TREAD COMPOUNDS

	Continental A	Continental B	Phoenix	Dunlop	Leverkusen
Buna S-3 (700 Defo)	40.00	100.00	100.00	95.2	100.00
Buna S-3 (300 Defo)	17.3	.....	.....	.....	.....
Buna SS (700 Defo)	3.5	.....	.....	.....	.....
Buna S-3 Crumbs [1]	39.2	.....	.....	.....	.....
Whole Tire Reclaim	.....	.....	.....	9.0	.....
Total RHC	100.00	100.00	100.00	104.2	100.00
Plasticizer No. 32 [2]	6.86	8.73	1.98	.....	3.00
Naftolen	19.6	0.52	5.28	8.87	4.5
Kakol [3]	1.18	.....	.....	.....	.....
Aktiplast [4]	1.18	2.80	0.99	0.57	.....
Ozokerite V	1.18	1.22	.....	.....	1.5
Softener WA3 [5]	.....	.....	.....	3.40	1.5
Rosin	.....	.....	0.99	.....	1.0
Stearic Acid	.....	.....	.....	.....	1.5
Ceresin	.....	.....	1.52	.....	.....
Kautschol [6]	.....	1.75	3.72	.....	.....
Paraffin	.....	.....	.....	2.22	.....
Total Softener	30.00	15.02	14.48	15.06	13.00
Black CK3 or CK4	52.5	.....	42.00	51.5	42.00
Anacarbon-40498 [7]	.....	32.00	.....	.....	.....
Black P1250	.....	16.00	.....	.....	.....
Total Black	52.5	48.00	42.00	51.5	42.00
Zinc Oxide (Coarse)	9.00	0.65	4.95	5.3	6.00
Kieselghur	.....	0.87	.....	.....	.....
Phenyl betanaphthylamine	1.18	1.04	0.99	0.72	0.8
Vulkacit AZ [8]	0.39	1.04	0.75	.....	0.9
MBTS	0.39	.....	.....	1.17	.....
Sulfur	2.55	2.08	1.98	2.16	2.2

Note: Continental A tread used for all tires except airplane tail wheels, which are of Compound B.
(1) Raw Buna S-3 which had not been sheeted. (2) Viscous sodium polymerized low molecular weight butadiene polymer. (3) 50/50 mixture brown coal tar and rosin. (4) Zinc salt of synthetic fatty acid (substitute for stearic). (5) Wool fat substitute. (6) Brown coal tar. (7) Conductive acetylene black. (8) Similar to Santocure in curing effects.

Mixing Procedures

Mixing methods of the three companies for the tread and carcass stock formulations shown in Tables IV and V are outlined below:

1. CONTINENTAL TREAD STOCK

Banbury rotor speeds: 14 and 15.5 r.p.m. (decreased from former speed of 22 r.p.m. because of Banbury overheating).
Cooling water temperature: 13-14° C.
Masterbatches: (a) Buna S crumbs and Naftolen in 2 to 1 ratio mixed separately in Banbury. (For purpose of absorbing large quantities of softener for masterbatch purposes. Continental preferred the crumb whenever available.)
(b) Buna S-3 and Plasticator No. 32 in 3 to 1 ratio mixed in Banbury.
(c) Accelerator master of 10% Vulkacit AZ and 90% Buna SS.
Batch size: 170.05 Kg.
Mixing cycle: Buna S-3, Buna S-3 crumbs-Naftolen master and Buna S-3-Plasticator No. 32 master Ozokerite V and Aktiplast..... 3 minutes
Black and other materials except Kakol and accelerator master ..... 6 minutes
Kakol ..... 4 minutes
Unloading time ..... 1 minute
14 minutes
The batch is dumped on an 84" mill below the Banbury. Rolls set fairly open.
Batch passed once through completely and then put around roll and cut four times from each side. Time..... 12 minutes
Removed on automatic cut-off, cooled, dusted 2 minutes
Total..... 14 minutes

70.01 Kg. of this batch weighed out and put on first of a pair of 84" mills, set tight so this weight of batch gives rolling bank. Stock cut continually back and forth for 9 minutes, then cut and fed to second mill which is directly back of first mill.
As soon at batch covers rolls, accelerator master added and stock cut twice from either side. Sulfur added, batch cut twice from each side and end-passed 3 times.

Time on second mill ..... 8 minutes
Remove in S slabs and dust..... 2 minutes
Total..... 10 minutes

Finished stock is rested at least 24 hours before tubing.
To prevent overheating, speeds of 84" mills have been reduced from 30 m per minute front roll, and 33 m per minute back roll (formerly used for natural rubber), to 22 and 24.75 respectively for Buna.

2. PHOENIX TREAD STOCK

A 150 Kg. batch is mixed in a Werner Pfleiderer mixer.

Buna S Type 3 with the Rosin..... 2 minutes
Aktiplast and Ceresin ..... 3 minutes
Kautschol and Naftolen ..... 3 minutes
Plasticator 32 ..... 5 minutes
Unloading time ..... 2 minutes
Total..... 15 minutes
Transferred to 84" mill
Thoroughly worked ..... 10 minutes
Batch taken off in 8 slabs—air cooled..... 5 minutes
Total..... 15 minutes

After not less than 8 hours, the batch as mixed above is placed in a Banbury and worked....	8 minutes
Carbon black	10 minutes
Unloading time	2 minutes
Total.....	20 minutes
Transferred to 84" mill	
Thoroughly worked	15 minutes
Batch cut off in 10 slabs—water cooled.....	5 minutes
Total.....	20 minutes
After not less than 8 hours, the masterbatch as mixed above is reweighed and an amount sufficient to make a final batch weight of 50 Kgs. is placed on the 84" mill and milled....	2 minutes
Accelerators and PBN	4 minutes
Zinc	5 minutes
Sulfur	4 minutes
Batch-off time	5 minutes
Total.....	20 minutes

Note: Before masterbatch is put on an 84" mill, it is given one pass through a cracker. The stock is allowed to rest not less than 16 hours before tubing.

3. Dunlop Tread Stock

To illustrate Dunlop practice, there is given below the complete mixing procedure for the compound shown in the formula table which was used for treads for passenger cars and small trucks.

Black Master Batch

Buna S-3 (Defo 700)	50.750
Reclaim	5.650
Zinc Oxide	2.050
CK-3 Black	32.200
Aktiplast	0.150
Paraffin	1.325
Softener WA3	2.125
Naftolen	5.300
P.B.N.	0.450
	100.000

4 450 pound (200 Kg.) batch is mixed in the Werner-Pfleiderer mixer in 25 minutes as follows:

Buna + Reclaim	4 minutes
Softener WA3	4 minutes
P.B.N.	1 minute
Naftolen	7 minutes
Black—ZnO, Paraffin, & Aktiplast...	7 minutes
Dump	2 minutes
	25 minutes

After dumping and cooling, the batch is passed once through a tight refiner requiring 35 minutes.

Sulfur Master Batch

Buna S-3 (Defo 700)	60
Zinc Oxide	10
Naftolen	5
Sulfur	25
	100

A 130 pound (60 Kg.) batch is mixed in 40 minutes on an 84" mill as follows:

Buna mastication	5 minutes
Naftolen—add slowly	15 minutes
Sulfur and ZnO (mixed)	10 minutes
Cutting	5 minutes
Removing and marking	5 minutes
	40 minutes

Accelerator Master Batch

Buna S-3 (Defo 500)	77.000
Zinc Oxide	10.000
Aniline Red (for color)	0.100
Aktiplast	2.900
MBTS	10.000
	100.000

A 120 pound (50 Kg.) batch is mixed in 31 minutes on an 84" mill as follows:

Buna mastication	4 minutes
MBTS, Color, ZnO	10 minutes
Aktiplast	8 minutes
Cutting	5 minutes
Removing	4 minutes
	31 minutes

Final Batch

Black Master	88.700
Sulfur Master	4.800
Accelerator Master	6.500
	100.000

A 110 pound (40 Kg.) batch is mixed in 12 minutes on an 84" mill.

4. Continental Part Crude Skim

Smoked sheets premasticated—150 Kg.—23 minutes—84" mill, then strained (most of rubber received recently has been very dirty).

Banbury rotor speeds: 14 and 15.5 r.p.m.
Cooling water temperature: 13-14° C.
Batch size: 190 Kg.

Mixing Cycle:

Rubber, Buna S-3	3 minutes
Black, zinc, accelerators	5 minutes
Kakol	7 minutes
Unload Banbury	1 minute
	16 minutes

Dump temperature—126-128° C.

Batch is dumped on an 84" mill below the Banbury, allowed to pass through rolls once, then banded, cut four times from each side and allowed to pass through the rolls completely. Time 16 minutes, including 2 minutes for removal and dusting.

70.05 Kg. of this batch weighed out and placed on one 84" mill, worked back and forth, then after 7 minutes working cut over to the second 84" mill directly in back. As soon as the whole batch is on mill B, sulfur is added, stock cut three times from each side, then passed through roll completely. Mixing time 6 minutes, plus 2 minutes for removal.

5. Phoenix Skim Coat Stock

Mixer—Werner Pfleiderer. Batch weight—200 Kg.

Buna S worked	4 minutes
HM-20* put in and mixed	8 minutes
Accelerator	2 minutes
Zinc and black	6 minutes
Naftolen added	8 minutes
Mixer emptied	2 minutes
	30 minutes
Batch is transferred to 84" mill. Stock is thoroughly worked	25 minutes
Batch taken off in 12 slabs. Water cooled....	5 minutes
	30 minutes

* HM-20 is a softener masterbatch of 5 parts Naftolen, 4 parts rosin and 1 part Koresin.

TABLE V—CARCASS COMPOUNDS

	Continental					Phoenix		Dunlop	
	100% Buna Skim Coat	Part Crude Skim	100% Buna Cushion	100% Buna Undertread	Part Crude Cush. & U. T.	Skim Coat	Cushion	Outer Ply Skim	Inner Ply Skim
Buna S-3 (1200 Defo)	....	....	....	....	....	....	100.0	....	....
Buna S-3 (700 Defo)	66.7	85.8	80.5	66.8	66.5	....	....	....	....
Buna S-3 (300 Defo)	33.3	....	19.5	33.2	....	....	....	....	....
Buna S-3 (900 Defo)	....	....	....	....	....	....	....	100.0	....
Buna S-3 (1100 Defo)	....	....	....	....	....	....	....	....	77.2
Buna S (500 Defo)	....	....	....	....	....	50.0	....	....	....
Buna S (Unsoftened)	....	....	....	....	....	50.0	....	....	22.8
Natural Sheets [1]	....	14.2	....	....	....	....	....	....	....
Natural Sheets [2]	....	....	....	....	33.5	....	....	....	....
Total RHC	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Kakol [3]	11.1	13.3	13.4	8.65	10.8	....	....	....	....
Koresin	1.3	....	....	2.85	....	1.0	3.45	4.3	5.0
Rosin	....	....	....	....	....	4.0	2.70	....	2.0
Naftolen	....	....	....	....	....	22.0	4.60	4.2	17.5
Kautschol [4]	....	....	....	....	....	....	1.55	....	....
Softener No. 32 [5]	....	....	....	....	....	....	....	4.3	....
Aktiplast [6]	....	....	....	....	....	....	....	....	0.1
Total Softener	12.4	13.3	13.4	11.5	10.8	27.0	12.3	12.8	24.6
Black CK4	11.1	11.3	....	....	....	....	....	....	....
Black P1250	11.1	11.3	30.4	22.1	21.8	4.0	....	50.8	....
Black P33	....	....	....	....	....	8.0	....	....	....
Heavy Lampblack	....	....	....	....	....	....	25.1	....	....
Light Lampblack	....	....	....	....	....	8.0	....	....	....
Black [7]	....	....	....	....	....	....	....	....	27.8
Total Black	22.2	22.6	30.4	22.1	21.8	20.0	25.1	50.8	27.8
Zinc Oxide (Coarse)	19.6	26.0	30.2	18.55	45.0	49.76	50.0	4.34	42.5
Phenyl beta naphthylamine	....	....	....	0.70	....	....	....	....	....
Vulkacit AZ [8]	....	....	....	....	....	0.88	0.84	0.43	1.0
MBT	....	....	....	....	....	....	....	1.72	....
MBTS	1.35	1.33	1.25	1.41	1.27	0.32	0.31	....	0.3
DPG	0.95	1.06	1.07	0.70	0.64	....	....	....	....
Sulfur	2.22	2.25	2.32	2.11	2.27	2.40	2.37	2.15	2.5

(1) Masticated and strained. (2) 3 breakdowns—1000 Defo. (3) 50/50 mixture of brown coal tar resin. (4) Brown coal tar. (5) Viscous sodium polymerized low molecular weight butadiene polymer. (6) Zinc salt of synthetic fatty acid and substitute for stearic. (7) Information as to exact type lacking. (8) Similar to Santocure in curing effects.

Master batch is rested at least 8 hours and final batch size of 100 Kgs. is mixed on 84" mill.

The masterbatch is given a pass through a very tight mill	2 minutes
Accelerator AZ is added, mixed	4 minutes
Sulfur mixed	4 minutes
Batch taken off in 6 slabs, water cooled	5 minutes
	15 minutes

Tread Preparation

At Continental, for sizes through the 190 mm x 20", the treads and sidewalls were tubed in one piece. The larger tires used separate calendered sidewalls. Tread cap and base constructions were not used.

Treads were handled in two ways at the Continental Hanover Plant. All were tubed to an extra length, but in some sizes undertread gum was calendered directly onto the hot tubed tread. The treads with the undertread applied were recut with a long bevel, the ends cemented and spliced into tread bands, using mechanical pressure. Treads without undertreads applied at the tread tuber were fed through a mechanical buffing device equipped with a fine wire buffing wheel, then run through a cementing process and a drying oven. After being cut to exact length with a long bevel they were banded with mechanical pressure.

At Continental Nordhafen all treads were put through the buffing and cementing operation. The treads were banded for about half of the production, the others being spliced on the tire building machines. The reason for this was that the plant manager questioned the value of the tread banding method and tires were being produced both ways until service results proved which was the better. At the time production was stopped a final decision had not been made as to the relative merits of the two systems.

In view of the fact that tread separation was at one time by far the most serious defect in Continental Buna tires, there had been considerable experimental work to improve the tires from this standpoint.

It was divulged that the most effective method that had been found to improve tread adhesions was to punch holes in the uncured tubed tread resting over a

TABLE VI—BEAD COMPOUNDS

	Continental		Phoenix	
	Insulation	Bead Cover Friction	Insulation	Bead Filler
Buna SS (1000 Defo)[1]	36.0	.....	.....	.....
Buna SS (800 Defo)	.....	.....	37.80	.....
Buna S-3 (700 Defo)	.....	48.15	.....	.....
Smoked Sheets	.....	25.35	.....	.....
Tread Stock	.....	.....	.....	76.0
Whole Tire Reclaim	.....	.....	.....	20.0
Cord Trims—Milled and Refined	20.0	.....	.....	.....
Plasticator No. 32 [2]	4.0	.....	5.44	.....
Plasticator RA [3]	4.0	.....	.....	.....
Kakol [4]	.....	6.4	.....	.....
Kautschol [5]	.....	.....	3.60	.....
MRX	.....	.....	1.80	.....
Rosin	.....	.....	.....	4.0
Black CK4	23.0	.....	7.20	.....
Black P1250	.....	13.60	.....	.....
Zinc Oxide (Coarse)	3.0	3.10	3.60	.....
Whiting	.....	.....	14.60	.....
Dixie Clay	.....	.....	14.80	.....
Phenyl beta naphthylamine	.....	0.50	.....	.....
DPG	.....	0.50	.....	.....
MBTS	0.20	1.0	0.36	.....
Sulfur	9.80	1.40	10.80	.....
	100.00	100.00	100.00	100.00

(1) High styrene polymer for smooth tubing. (2) Viscous sodium polymerized low molecular weight butadiene polymer. (3) Residue from ethylbenzene distillation. (4) 50/50 mixture of brown coal tar and rosin. (5) Brown coal tar.

slab of uncured compound. The piercing was with a rather blunt 3 to 5 mm diameter punch, the holes being placed approximately 8 cm apart at both shoulders and extending completely through the tread stock. With these holes in the uncured tread to remove trapped air, the tires reputedly gave much better test wheel mileage before tread separation occurred. Reduction of curing defects was also claimed.

It was asked whether soapstone or other lubricant enters these holes to cause trouble due to starting tears or cracks in the cured tread, the answer being that there had been no difficulties.

The Continental cement used on the treads after buffing and also on the tread splices was a thick cement made to the composition shown in Table IX.

Phoenix procedure was to cut the treads at the tube machine to an extra length and store until thoroughly cooled and set. They were then washed by hand with cement and passed through a buffing machine before drying. It was considered that the buffing of wet treads is more effective than dry buffing. The buffed, cemented treads were then cut on a long bevel to the proper final length and, depending upon size, part of the treads were spliced to form bands and the remainder went to the tire builders without splicing.

Phoenix was not performing the operation of puncturing the uncured tubed treads. The Phoenix cement shown in the formula tables was used also as a tread splicing cement.

Rayon Fabric Dipping and Doughing

Rayon cord was delivered to Continental with approximately 12% moisture content. On receipt, the material was stored in a hot room at 40° C. in order to bring all rolls to a uniform moisture of 9 to 10%. The fabric was then dipped on equipment capable of processing a maximum of 4 meters per minute. The solids deposit was approximately 8% on the weight of the cord. The dipped fabric was dried to 2 to 4% moisture and then stored in a hot room at 45 to 50° C.

Continental used either a resorcinol-formaldehyde or haemoglobin solution for dipping, depending on the availability of materials. Most of the tires were treated with the former, which was the preferred dip.

The Phoenix Plant used a haemoglobin dip rather than a resorcinol-formaldehyde dip. This preference was based on test results obtained on a laboratory machine designed to study cord-to-rubber adhesions, the principle of which is described briefly under the section on "Testing and Development." The formulas used at Continental and Phoenix are shown in Table X.

In the Continental Plant, the rayon fabric, prior to skim coat calendering, was passed over 6 to 8 drying drums and then through a "dough" calender depositing about 80 grams per square meter of the compound shown in the formula tabulations below. The doughed cord was again stored in a hot room until ready for the calenders.

The purpose of this doughing operation was to develop a better bond between the dipped cord and the skim coat. Also, without this operation there is a tendency for the Buna compounds to follow the rolls and leave bare places on the cord. Softer or tackier skim coat stocks are possible with doughed fabric.

The German tire men felt that this operation brought about an improvement in tire quality, particularly if the tire was used in high temperature runs. Laboratory adhesion tests also indicated the desirability of this treatment.

Fabric for passenger tires was not put through the

TABLE VII—TIRE CONSTRUCTION SPECIFICATIONS

(550-16 Leverkusen)

Tire weight: 8.78 Kg.

Shoulder type drum: 442 mm diameter, 345 mm set width.

Plies: 13/2/3 Rayon—7.6 ends/cm before dipping. Calendered weight of ply stock: 420 g/sq. m fabric plus 50 dip plus 80 dough plus 700 coat stock = 1250 total. (Truck plies are same except 800 g/sq. m of coat stock is used.)

Cutting Angle: 31.5°. Ply lengths and widths in mm:

1—1370 x 505
2—1380 x 400
3—1390 x 425
4—1400 x 415

Total ply area: 2.47 sq. m; ply weight: 3.08 Kg.

Squeegee: Top of plies 2 and 3; 275 and 225 mm wide; 0.5 mm gauge.

Cushion: 330 mm wide, 0.5 mm gauge.

Fabric breaker: None.

Rubber shock pad: 2 plies, 125 and 150 mm wide; 0.75 mm gauge.

Carcass compounds: Ply compounds and squeegees of one compound; cushion and shock pad of another stock. Same formulas as used in truck tires.

Bead: 4 turns of 4—0.9 mm gauge wires, wrapped.

Flipper or insert: None.

Chafer: Single—70 mm wide of 290 g/sq. m spun rayon fabric, dipped, dough-treated, and coated to a total area weight of 800 g/sq. m.

Tread weight: 4.00 Kg (one piece). Same compound as truck tread.

Tie-In: Three plies under bead, one over. Plies 1 and 3 high turn up. Ply 2 under bead ending at heel, ply 4 under bead ending at toe. Chafer around toe.

Cure: See section on tire curing.

dough calender at Continental, but was run with heavier skim coat gauges than fabric for truck tires. Specifications for another plant, however, showed the opposite approach, that is, passenger cord did use dough and the skim coat deposit was lighter than for trucks.

Apparently the doughing process was an undesirable factory operation, because despite claims of improved product, experiments were being conducted with a view to eliminating doughing. The dough used at Continental is prepared from the following compound:

Buna S-3 (700 Defo)	100.0
Coumarone Resin	4.0
Naftolen	6.1
Black CK4	40.0
Zinc Oxide—Coarse	20.5
MBTS	0.2
Vulkacit AZ	0.8
Sulfur	2.0

Solution: 1 part by weight stock to 3.5 parts by weight of benzol; 4 to 6 hours in Werner-Pfleiderer mixer.

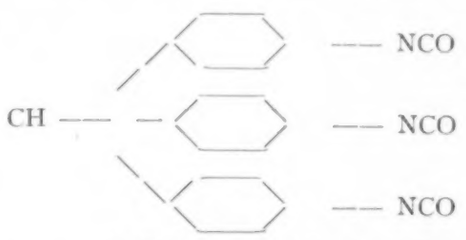
The above formula was used in production, but if sufficient Koresin were available, the following cement compound was considered good:

Buna S-3 (700 Defo)	100
Black CK4	50
Koresin	8
Zinc Oxide	15
Vulkacit AZ	2
Sulfur	4

Phoenix also uses the dough treatment. The stock is the same as used for the Phoenix tread, but is mixed longer to make it softer. A Werner-Pfleiderer is used to mix a heavy dough in a solvent of 2 parts gasoline and 1 part benzol.

Desmodur R

In connection with the dipping and doughing operation it may be of interest to touch briefly on a development that was in progress at the Phoenix Plant with a material called Desmodur R. This chemical, an I. G. product, is said to have the following formula:



p, p′, p″,—isocyanto-triphenyl methane or tri-isocyanate of triamino triphenyl methane

The claims for Desmodur R were threefold:

1. By using a Desmodur R stock to dip the rayon cord it should be possible to eliminate the doughing operation which is necessary when conventional dips are used. Tires manufactured by the Desmodur R method were said to perform as well on the road as regular tires.

2. After calendering, Desmodur R-treated cord fabric is much more flexible and, therefore, easier to handle in the tire building operations.

3. More satisfactory rubber-to-Perlon adhesions were obtainable by using Desmodur R than with regular dips.

Table VIII—Tire Construction Specifications

(7.25-20 and 9.75-20 Leverkusen)

Size and Type:	7.25-20 Traction	9.75-20 Highway
Tire Weight:	26.82 Kg.	52.74 Kg.
Drum:	Shoulder Type	Under cut or flat top core
Drum diameter and set width:	570-405 mm	730-410 mm
Plies: 13/2/3 Rayon. Inner plies 7.6 ends/cm before dipping. Calendered weight of ply stock: 420 g/sq. m fabric plus 50 dip plus 80 dough plus 800 coat stock = 1350 total. Two outer plies are 5.5 ends/cm before dipping. Calendered weight of ply stock: 325 g/sq. m fabric plus 35 dip plus 60 dough plus 1030 coat = 1450 total.		
Number Plies:	8	10
Cutting Angle:	31°	36°
*Ply lengths and widths:** Ply No.	1—1700 x 610 mm 2—1700 x 585 mm 3—1715 x 700 mm 4—1715 x 675 mm 5—1730 x 625 mm 6—1730 x 600 mm 7—1750 x 550 mm 8—1750 x 575 mm 9— ..... 10—	2145 x 820 mm 2145 x 740 mm 2165 x 740 mm 2165 x 720 mm 2185 x 855 mm 2185 x 740 mm 2205 x 775 mm 2205 x 740 mm 2225 x 720 mm 2225 x 750 mm
Total ply area:	8.48 sq. m	16.60 sq. m
Total ply weight:	11.62 Kg.	22.72 Kg.
Number Squeegees:	5	7
Position, width and gauge in mm:	Bottom 1—400-.40 Top 4—325-.40 Top 5—300-.40 Top 6—275-.40 Top 7—250-.60	Bottom 1—575-.40 Top 4—520-.40 Top 5—500-.40 Top 6—475-.50 Top 7—450-.50 Top 8—475-.50 Top 9—500-.60
Cushion on top ply: width and gauge in mm	325-0.60	550-0.60
Fabric breakers:	None	None
Rubber shock pad: 3 ply width and gauge	1—150-0.80 mm 2—200-0.80 mm 3—225-0.80 mm	1—225-1.0 mm 2—330-1.0 mm 3—335-1.0 mm
Carcass compounds: There appear to be only two stocks used. Inner plies and all squeegees except between top two plies is one compound. Two outer plies, squeegee between these plies, cushion and shock pad are of another stock.		
Bead wire: 0.9 mm gauge wrapped	7 turns 8 wires	toe—8 turns 6 wires heel—9 turns 8 wires
Flipper widths:	None	1—25 mm 2—160 mm
Insert or fabric bead reinforcement widths:	1—80 mm 2—90 mm	1—110 mm .....
Chafer widths:	1—80 mm 2—110 mm	1—110 mm 2—160 mm
Square woven fabrics: Spun rayon of 350 g/sq. m weight. Dipped, given dough treatment, and coated, the respective area weights being 25, 50 and 450 grams or a total for the treated fabric of 875 grams/sq. m.		
Gum strips: Chafers, flippers, and inserts use gum strips 30 mm wide 0.50 mm gauge of inner ply compound. The cord ply edges are not gum stripped.		
Tread weight:	9.43 Kg.	13.65 Kg.
Sidewall weight: †	None	2.35 Kg.
Tie-ins: 7.25-20—3 bands under, 1 over bead. First band under bead to heel. Second band turns up around bead. Square woven insert between second and third bands under bead to heel. Third band turned up around bead, lower than second. On top of second band turn-up there is a square woven insert which goes under bead to toe. Last band to toe. Chafers under bead, one to toe, one turned well into tire. 9.75-20—first and second bands turned up around toe bead, first band higher than second. Third and fourth bands turned up around heel bead, third band higher than fourth. Square woven insert is placed between third band turn up and fifth band under bead to toe. Fifth band under bead to toe. One chafer to toe, one around and well up into tire. (Assumed that 2 ply bands were used, but construction would permit use of four ply bands.)		
Curing: See section on tire curing.		

* From the ply dimensions and bead tie-ins, it would appear that for both tires two-ply bands were used, with approximately 5% stretch to the drum for the 7.25 and 7% for the 9.75.

† The 7.25-20 Highway tire is exactly the same as these, except that the tread weighs 7.45 Kg, giving a finished tire weight of 24.84 Kg.

The Desmodur R solution is prepared by first mixing the following stock:

Buna S-3 (Defo 1000)	100.0 Kg.
Pine Tar	14.5 Kg.
Zinc Oxide	30.0 Kg.
Black CK4	22.0 Kg.
Black P1250	13.0 Kg.
	179.5 Kg.

The above compounded stock is dissolved in a 50 benzol-50 gasoline solvent, in the ratio of one part of the stock per six parts of solvent. The cement is made up just prior to using, because it gels in approximately 24 hours. The pine tar tends to stabilize the solution somewhat. 1.125 Kg. of a 20% solution of Desmodur R in methylene chloride per 10 kg. of the compounded stock is then added to the cement. This amounts to approximately 4% Desmodur R, based on the Buna content. The cement should be used within 24 hours. That which has not been consumed within 24 hours is diluted to a solid content of 10% and is used to impregnate the fabric used for bicycle tires. During the dipping operation, the solvent is recovered by means of activated carbon.

The dipped fabric is dried at 60°-80° C. in hot air. After dipping, the fabric can be stored for three or four days before calendering.

The use of Desmodur R dip solution was also suggested for use on fabric for conveyor belts, hose, bicycle tires, and possibly footwear, to improve adhesion.

In addition to the information of the work at Phoenix two development reports having to do with Desmodur R experimental work were obtained at the Leverkusen Central Laboratories. The first deals with attempts to improve on the conventional dipping and doughing method by dipping pre-dried rayon cord in a 2.0% solution of Desmodur R and methylene-dichloride, then doughing and skim coating. The reasons for this approach were:

a. Water solutions should be avoided during rayon processing.

b. Improved adhesions should result.

c. The flexibility of rayon cords is retained, making for easier handling of plies during tire building.

TABLE IX—COMPOUNDS FOR TREAD CEMENTS

	Continental	Phoenix	Dunlop
Buna S-3 (700 Defo)	100.00	.....	.....
Buna SSE (200 Defo)[1]	.....	100.00	100.00
Kautschol[2]	4.95	4.90	5.00
Koresin	19.80	.....	10.00
Black CK3	29.80	29.40	30.60
Zinc Oxide (Coarse)	4.95	15.00	15.50
Vulkacit AZ[3]	1.09	1.00	0.95
MBTS	0.31	.....	.....
Sulfur	4.05	3.06	3.1
	1 lb. Stock to 4 lb. Gasoline by weight	1 lb. Stock to 10 lb. Gasoline by weight	1 lb. Stock to 6 lb. Gasoline by weight

(1) High styrene iron-free Buna. (2) Brown coal tar. (3) Similar to Santocure in curing effects.

It was reported that in laboratory tests Desmodur R was harmful as regards resistance to flexing, especially after a heating period. No such damage was found, however, in experimental tires which had been run presumably on a test wheel. Desmodur R tends to cause scorchiness in compounds and therefore it was found advantageous to use dough compounds without curing agent. Attempts to eliminate the doughing operation were not successful.

The second phase of the work has to do with eliminating the impregnating process and applying a Desmodur R-containing dough directly to the dried rayon.

Desmodur R comes as a 20% solution in methylene-dichloride. This is diluted in benzol or a 50 benzol-50 gasoline mixture and added to the dough which has the following composition (2.2% of Desmodur R based on the Buna content is used in the dough as applied):

Buna S-3 (Defo 1000)	100
Carbon Black CK3	40
Coumarone Resin	4
Naftolen	6
Zinc Oxide	20

Desmodur R solutions tend to gel and produce scorch in compounds. Also, trouble was encountered in that dried out dough containing Desmodur R was very hard to remove from drying drums and other parts of the doughing machine. These difficulties were solved eventually by applying a second coat of dough from which the Desmodur R is omitted.

Calendering

Calenders for rayon cord were of the four-roll type. Continental speeds were from 15 to 20 meters per minute, which is about half that used with natural rubber compounds. The raw cord had a gauge of 0.86 mm, the treated but uncalendered cord thickness was .93 to .96, and the skim coated cord gauge was approximately 1.25 mm, although it varied somewhat according to tire size.

Although equipment was installed at the four-roll calenders for cementing the calendered ply stock, it had not been used regularly in recent months either for the 100% or 86% Buna compounds. The superiority of Buna S-3 over the old Buna for adhesive qualities plus the use of Koresin in the 100% compounds (Koresin was not used in the 86% stocks) made it possible to eliminate the cementing operation, provided the stock was used within a reasonable time after calendering.

However, if the ply stock did not go into tires within a day it was necessary to treat with a Koresin solution. This was done at the calender if full rolls had to be freshened or in the tire building department in the case of bias-cut plies. This re-treating was again good for approximately 24 hours, after which it became too dry to be used efficiently.

Bead Preparation

All pneumatic tire beads at the Hanover and Nordhafen plants of Continental were made of fillerless creeled wires of 0.9 mm gauge having a tensile of 200 to 220 Kg per square mm, or 125 to 140 Kg for an individual wire.

The wire insulation and bead filler were of the compound shown in the table of bead formulations (Table VI). After tubing and forming, the beads were dipped into a cement made of the bead cover compound, which contains an appreciable percentage of

natural rubber. When dry, the beads are covered with a staple rayon fabric, frictioned both sides with the bead cover friction stock.

Single bead construction was used in tires through the 190 mm x 20", including the 6" and 7". Above these sizes, and through 11.25-20, dual beads were used with triple beads in the very few large sizes that were made.

Phoenix practices and methods were generally similar to those of Continental. A tread stock type bead filler was used instead of a hard rubber compound as at the former plant.

Stock Preparation

Ply material was cut on horizontal type "Banner" units. Vertical "Spadone" machines were used for cutting square-woven fabrics.

The bias angle was varied depending on the size tire and type of building drum. The aim was to obtain a cured tire cord angle of 39° to 40° measured from the circumferential ply center line, that is, using a longer cord than would result with a 45° angle.

Because the plants were not in production, such operations as square woven fabric lay-up, gum stripping devices, and squeegeeing methods, were not studied.

Tire Building

Tire machines and building drums were of the same general design as used in this country, but not as modern. For the large dual bead tires they had the undercut or flat top core drums. Collapsible drums of conventional design were used for building passenger tires and single bead truck tires.

Flat top core built tires were built with two-ply bands at Continental and two- or four-ply bands at Phoenix. The single bead tires used two-ply bands or single plies out of trays mounted at the tire machines.

Squeegees were used instead of heavy cord ply fabrics to avoid a surplus of gum in the bead area. In the eight-ply 32 x 6 size, Continental used squeegees on the bottom and top of the first ply and on the top of plies six and seven. A ten-ply tire size would have two more squeegees on the top of plies eight and nine.

As stated previously, except for recent experimental tires, breaker strips were not used in truck, passenger, or airplane tires.

The following information on tire building rates is from Phoenix:

Size	*Ply*	*Tires per Hour*
6.00-16	6	4.0
6.00-20	6	3.5
7.25-20	8	2.8
9.75-20	10	0.53

Based on material costs of December, 1944, and labor and overhead rates of the first six months of 1944, tire cost information was furnished as follows:

Size	*Weight Tire Kg.*	*Material Cost in Reichmarks (40c)*	*Cost per Tire**
5.50-16	7.96	17.57	25.82
6.00-20	15.71	39.78	54.22
7.25-20	27.79	69.73	80.16
9.75-20	48.89	124.30	164.29
11.40-410	56.51	148.76	199.89

* Including labor and overhead, but not including amortization and taxes.

Tire Curing

All passenger and truck tires were shaped on vertical type pressure equipment which functioned in the same manner as the pressure shapers used in the United States. Vacuum boxes were not used. Continental had individual vulcanizers for sizes through 7.00-20 and pot heaters using the "Palmer-Bee" conveyor system for larger sizes.

Defects at Continental were principally blown plies and blows under the tread. The improved adhesive qualities of Buna S-3, the use of Koresin, increased stitcher pressure to eliminate trapped air, and the practice of puncturing uncured treads, all contributed to an appreciable reduction of defects, it was claimed.

Phoenix used individual vulcanizers for all sizes. Despite lack of provisions for cooling, Phoenix engineers maintained that curing defects were not exces-

Errata on Part I

The following typographical errors have been called to our attention on Part I of this Summary Report on German Synthetic Tires: (1) In the footnote on Page 568 the diameter of the test piece should be 10 mm instead of 100 mm. (2) The third item under "Latices" on Page 568 should read "Igetex N is the latex of Perbunan in 30% concentration as manufactured." (3) The gauge of the 33/3/3 cord in Table III on Page 571 should be 0.62 instead of 0.52.

TABLE X—RAYON DIP FORMULAS

(1) Continental—Resorcinol (Preferred)

	By Weight
Igetex S (35% solids)	14.7
Resorcinol-Formaldehyde Master*	30.0
10% NaOH	0.8
Water	54.5
	100.0

(2) Continental—Haemoglobin (Alternate)

Igetex S (45% solids)	15.87
Haemoglobin Master**	14.30
Water	69.85
Methylene Blue	0.005
	100.025

(3) Phoenix—Haemoglobin

Buna Latex	64 Kg
Boiled Water	41 Kg
HK Solution†	70 Kg
	175 Kg

* Resorcinol (0.80), water (27.25), 10% NaOH (0.40), and 40% formaldehyde (1.55).
** Haemoglobin (2.86), water (11.01), 25% sol. ammonia (0.429), and phenol (0.001).
† HK Solution was made as follows: Stir 3.75 Kg haemoglobin slowly with 12 Kg cold water and 2 Kg of 10% ammonia solution. Then add 45.5 Kg hot water (50° C.) with 3 Kg of ammonia and 3.75 Kg of casein. This makes a total of 70 Kg. Cool before using. A small amount of phenol is used when available to prevent fermentation.

sive due to the doughing operation and to careful preparation and cementing of treads. An examination of a Phoenix tire scrap report for the first ten days of October, 1944, operations did not bear out these claims, however. The scrap loss was 5.5%, a figure which would be considered prohibitive in United States curing rooms.

Below are listed curing times and conditions for a series of sizes taken from Leverkusen specifications:

Size, Ply, and Type	Temperatures: External Steam	Temperatures: Internal Hot Water	Internal Pressure (Atm.)	Cure Time (Min.)	Change Time (Min.)
5.50-16 4 Ply Passenger	142°C.	138°C.	18-20	60	5
6.00-20 6 Ply Highway	142°C.	138°C.	18-20	70	6
6.00-20 6 Ply Traction	138°C.	138°C.	18-20	85	6
7.25-20 8 Ply Highway	140°C.	138°C.	18-20	90	7
7.25-20 8 Ply Traction	138°C.	138°C.	18-20	110	7

9.75-20 10 Ply Highway—external steam—60 minutes rise to 138°C., then 110 minutes at 138°C.—steam stepped down to 125°C.—then 25 minutes at 125°C.—steam shut off—mold cooled for 10 minutes. Total 205 minutes. Internal—hot water at 138°C. and 20 atmospheres pressure for 190 minutes plus 15 minute cooling period. Total 205 minutes.

Airplane, Bicycle and Farm Tires

Airplane tires were made from the same fabrics and compounds and processed by the same methods as ground tires. The one exception was the Continental tailwheel tire, which used a tread compound containing Anacarbon 40498, a very highly conductive acetylene black.

Bicycle tires were of importance in Germany, as many as 2,000,000 per month having been manufactured pre-war. Production had dropped steadily until in recent months less than one-half million were made monthly, although they were urgently needed. The tires were made of a cable rayon cord of light construction (33/2/3 at Phoenix). No natural rubber or natural rubber cements were used, but Buna stock was necessary for cementing treads and splices.

Production on Monoband machines was about 40 an hour. The tires were cured on airbags, the bags and the inside of the tires being lubricated with sodium silicate. Cures were from 5½ to 8 minutes at low temperatures of 160° to 170° C. Factory defects were fairly high, but road service on properly made tires was considered satisfactory.

Pneumatic tires for agricultural or industrial use apparently were not being manufactured.

(*To Be Continued*)

Method of Tapping Young Budded Trees

LATEX from young trees in general has a tendency to pre-coagulation, and this is especially pronounced in certain clones, according to a recent Advisory Circular issued by the Rubber Research Scheme (Ceylon). It can be prevented by the application of a dilute solution of sodium sulfite (not bisulfite) or ammonia to the tapping cut and in the collecting cup immediately after tapping. The use of these chemicals as anti-coagulants is well known, but application in the tapping cut is novel as far as Ceylon is concerned. The recommended method of using the anti-coagulant is as follows:

Each tapper is provided with a bottle (quart) fitted with a short bamboo tube held in the neck with a rubber collar or strip of cloth dipped in latex. Alternatively the bottle is fitted with a slotted cork, made of soft wood. The end of the cork or bamboo is tapered to a point thus enabling a few drops to be run down when the bottle is inverted. A solution of sodium sulfite (2%) or ammonia (1%) is placed in the bottle at the rate of 1 fluid ounce for each pint of latex which is likely to be collected. The bottle is then filled to the shoulder with water and well shaken to mix the contents.

Immediately after tapping each tree, about one teaspoonful of the solution is run down the tapping cut by holding the inverted bottle against the bark just above the top of the tapping cut. The amount used should be such that about one quarter of the contents of the bottle remains at the end of the tapping round. This is poured into the tapping bucket just before collection is started.

If the above dose of anti-cogulant is not effective the quantity may be increased up to a maximum of 2 ounces per pint of latex, but this should only be necessary if the latex is very susceptible to clotting or if the yield from the trees is low. An excessive dose of sodium sulfite is undesirable and will retard the rate of drying of smoked sheet; excess of either chemical will increase the dose of acid required for coagulation. In crepe manufacture the dose of sodium bisulfite added in the factory can be reduced in proportion to the amount of sodium sulfite used.

Latex containing an anti-cogulant can safely be bulked with other latex at the factory, and this is preferable to separate manufacture. The anti-coagulant will assist in stabilizing the bulked latex during settling and straining and the proportion of the chemical remaining in the finished rubber will be reduced.

The report also pointed out that if ammonia and sodium sulfite cannot be obtained, ordinary washing soda (sodium carbonate, cryst.) or soda ash (sodium carbonate, anhydrous) is a satisfactory wartime alternative. Because of its cheapness, washing soda will probably be preferred by smallholders even when other anti-coagulations are available. The main drawback to washing soda is the possible formation of bubbles in sheet but this tendency can be minimized by blending the latex containing soda with the main bulk. The anti-coagulant is used in the same way as sodium sulfite, the solution being made by dissolving 1 pound of washing soda (or 6 ounces of soda ash) in 5 gallons of water.

A new line of **axial-flow compressors, blowers and fans,** claimed to have pressure and flow characteristics far superior to any other equipment and to maintain exceptionally high efficiencies, has been announced by the Buffalo Turbine Co., Buffalo 11, N. Y. The incorporation of special motors having exceptionally high h.p. and small diameters has made possible equipment having an over-all weight of only 30% of conventional equipment. The line includes a wide range of direct driven units with air pressures from ⅜ths of an inch to 100 inches of water at synchronous motor speeds. Direct connected turbine driven units up to 100 psi and 100,000 cfm are also available.

Lignosulfonates for Synthetic Rubber

By L. J. D. HEALY

Consulting Technologist

THE synthetic rubber industry which, in the short space of several years has grown to be a million ton per year giant, has introduced many new compounding ingredients useful in processing these newer types of rubbers. Amongst these newer compounding materials worthy of consideration are the lignosulfonates. The lignosulfonates are by-products recovered from the lignin constituents of sulfite pulp mill liquors. The Marathon Corporation of Wisconsin were pioneers in attempting to recover valuable chemicals from these crude lignin liquors. This company is now successfully recovering many tons of valuable chemicals from their sulfite pulp mill liquors, amongst which are the lignosulfonates.

Properties of the Lignosulfonates

These Marathon lignosulfonates are segregated from the sulfite liquors by fractional precipitation and are compounds of high purity, being substantially free from non-ligneous matter and differing materially in specific properties from lignosulfonates of low purity obtained by evaporation of the whole sulfite liquors. They are commercially available as the salts of most metals and are obtainable in abundant quantities.

These lignosulfonates are amorphous compounds free from reducing sugars and other non-ligneous organic matter. They are non-hygroscopic and will remain free flowing powder during storage. The dry salts range in color from light tan to dark brown and are suitable for light colored rubber goods. They have no definite melting point and are stable up to temperatures of 400° F. Their specific gravity is approximately 1.5 and hence suitable for low gravity rubber compounds.

The basic calcium lignosulfonates have shown some very interesting results when compounded with the synthetic rubbers. Practically all of the synthetic rubbers are much more difficult to break down or plasticize into smooth processing compounds than was natural rubber. The synthetic rubber compounds have a marked tendency to retain their nerve, even after prolonged plasticizing or masticating on rubber machinery, and are prone to shrink badly after processing. Large volumes of fillers and plasticizers are necessary to produce smooth calendered or extruded stocks.

The addition of lignosulfonates to synthetic rubbers has a marked effect upon smoothing out such rubbers during processing. In fact, exceedingly smooth sheets without any perceptible shrinkage or change in shape may be obtained, even without the addition of any liquid plasticizer. Also, the milling is speeded up and large volumes of the lignin are quickly dispersed into the rubber in the time ordinarily consumed in masticating most rubbers.

The lignosulfonates are not reinforcing materials in the same sense as carbon blacks, for instance, and do not build up the tensile strength of synthetic rubbers. They do, however, offer excellent compounding and processing characteristics for certain types of synthetic rubber articles. With high lignin loading these lignin compounds impart to vulcanized synthetic rubber very desirable properties, such as resistance to cold flow, good compression-set characteristics, vibration dampening properties, excellent oil-resistance, and low permanent set. They are also excellent for compounding hard rubber products.

The oil resistance and compression characteristics of these lignin compounds are very desirable in gasket and oil seal stocks. When compounded with synthetic rubber, especially neoprene, a light weight gasket stock can be obtained which has many of the characteristics of cork but with better sealing properties. It is possible to make gaskets with a micro-porous internal structure having compressibility with minimum or no flow and which maintain positive pressure sealing under constant load or compression. The pressure can be made to increase during use so as to insure a tight seal at all times and prevent seepage of oil. The degree of compression can be controlled to meet any desired service required. It is also possible to make hard dense gaskets with either the Buna or neoprene rubbers.

Lignosulfonate, reinforced with lignin-coated cellulose fibers, can be compounded with the synthetic rubbers for making vibration dampening devices. These may be compounded so as to meet such requirements as oil resistance, resistance to load, resistance to flow or distortion, resiliency, etc. Compounding with lignosulfonates and lignin-coated cellulose fibers for soling stock is now being investigated.

Replacement for Hard Rubber Dust

Another use for the lignosulfonates is in compounding hard rubber products. The lignin may replace all of the hard rubber dust used in certain types of hard rubber goods. Compounding may be done with Buna S to produce soft plastic material which can be molded with low pressure in ordinary rubber molds to produce ebonite and plastic-like articles in short curing cycles of the order of seven minutes and up, depending upon size of the article to be molded. On account of the easy flowing characteristics, intricate designs are readily molded.

The lignosulfonates are also compatible with practically all of the usual rubber compounding ingredients and curatives which may be added to modify the physical properties of the finished article. Loadings of lignin up to 400 per cent on the rubber are practical and the molded articles take a good finish. Synthetic stocks compounded with lignin are also adaptable for both open steam and hot air cures as well as for press molding.

Editorials. . . . . .

Natural Rubber

NOW that hostilities in the Pacific have ended, although complete surrender of all Japanese forces has not been effected at this writing, the question that the rubber manufacturing industry wants answered is: How soon can we get natural rubber? British, Dutch, French and other interests, with vital stakes in the rubber-producing areas, are just as much interested in this question, and the world awaits an answer. Although special rubber missions are already in Malaya, Sumatra, Java, French Indo-China, and other heavy rubber-growing areas, it is too early to formulate definite replies to the question.

This much, however, seems evident: Natural rubber will be forthcoming sooner and in larger quantities than any of the predictions made during the past three years would indicate. The one theme that was repeated by the rubber experts throughout the occupation of the rubber-producing areas by the Japanese was that it would take one to three years after re-occupation by the Allies before rubber in appreciable quantities would start flowing to world consumption markets. The findings to date are in direct contradiction to such predictions. Not only are the plantations being found in fair condition, with the trees in healthy and tappable shape, but large quantities of baled rubber ready for immediate shipment are turning up. That such stockpiles are being located in various ports is a tribute to the effective blockade maintained by the United Nation's armed forces in the past two years.

According to a round-up of reports emanating from the rubber-producing areas, a stockpile of approximately 150,000 long tons has been located in the Netherlands East Indies, in addition to stockpiles of 150,000 tons in French Indo-China and 50,000 tons in Thailand (Siam). Although no specific estimate has yet been made of the stockpile in Malaya, reports indicate that between 50,000 and 200,000 tons are available for shipment. This means that a total of some 500,000 tons of rubber can be sent to consumption markets as soon as shipping is available. In one quarter, this amount was set closer to 750,000 tons, but that seems somewhat exaggerated. Production of rubber in these areas for 1946 has already been gauged at over 800,000 tons. So it would seem that the best answer that can be given to the question of how soon we can get natural rubber is soon—but sooner than expected.

Continued Subsidy?

LIKE practically all other industries, the rubber manufacturing industry is speedily reconverting to the manufacture of civilian goods—including many items banned since Pearl Harbor. In most cases "reconversion" is hardly the word, since the major problems of the industry were tied in with raw material supplies rather than with machinery or equipment. All restrictions on the use of rubber—except natural rubber and Butyl—have been lifted. Controls over natural rubber must continue until appreciable quantities are received from the Far East, while those on Butyl will continue until production is increased.

One special problem facing the rubber manufacturing industry is the matter of basic raw materials cost. It is a problem which only Congress can answer, since its core lies in the government subsidy on synthetic rubber produced in government-owned production facilities. Based on congressional action, GR-S, for example, is sold for civilian end-use at 18½ cents a pound, against a production cost ranging between 25 and 40 cents a pound, or an average of 31 cents a pound. This subsidy was authorized for the duration and six months. Current pricing regulations are based on the subsidy figure for most synthetic rubber products. Since it will still take several months before natural rubber arrives in sufficient volume to warrant removal of consumption regulations, the selling price of synthetic rubber will be a dominant factor in the selling price of finished rubber goods.

As reported elsewhere in this issue, Reconversion Director John Snyder has established an Inter-Agency Policy Committee on Rubber. One of the duties of the new committee, headed by William L. Batt, vice-chairman of the War Production Board, is to survey plans for the maintenance of stand-by synthetic rubber plants and the disposal of surplus plants. This embraces the problem of continued subsidy. The greatest congressional support for continuance of the subsidy will undoubtedly come from the powerful farm bloc, since the synthetic rubber industry is currently a major consumer of grain alcohol in the production of butadiene. The efforts of this bloc in the controversy over petroleum-butadiene versus alcohol-butadiene in 1942 will be recalled. Butadiene from alcohol costs approximately three times that of butadiene from petroleum. Nevertheless, the fight for continued subsidy will be bitter.

CURRENT NEWS OF THE MONTH

RESTRICTIONS ARE LIFTED ON ALL TYPES OTHER THAN NATURAL AND BUTYL RUBBER

ACTIVITIES in the rubber manufacturing field have stepped up considerably with the end of global warfare. Most of the activity, of course, centered in official Washington, and orders and revocation of orders flew thick and fast. Included among such activities were revocation of consumption restrictions on most types of rubber, cancellation of the balance of government-sponsored tire projects, withdrawal of rationing on various types of rubber products, organization of a special policy committee to formulate a national policy for the United States on rubber, changes in price formulas on rubber products, and other minor and major changes in the over-all regulations.

The big news in the rubber manufacturing industry was, of course, the lifting of all restrictions on products manufactured of reclaimed and scrap rubber and all types of synthetic rubber except Butyl. Both Butyl and natural rubber remain under rigid control. This action was accomplished by the issuance of Amendment 3 to Rubber Order R-1 as amended May 30, 1945, and Amendment 3 to Appendix I of the Rubber Order.

The amendments specifically delete reference to reclaimed rubber, scrap rubber, chlorinated synthetic rubber, and all other synthetics except Butyl, from Table A in Appendix I, covering permitted uses of materials, and change the wording of the introduction to Table A removing the necessity for rubber manufacturers to obtain WPB permission to manufacture listed products. Some of the items freed for unrestricted manufacture have already been produced in limited quantities.

Other Restrictions Removed

Among other restrictions removed since V-J Day are the following:

All restrictions on the number of passenger motorcycle and bicycle tires that may be manufactured were removed by the issuance of Amendment 4 to Rubber Order R-1 on September 5, the amendment deleting the section on "Tires and Tubes" from the order. At the same time the cancellation of directives as to the amount of cotton authorized for these tires was announced. Production limitations of passenger car tubes and small truck tubes (6.00-16 and 6.50-16) were also removed from quantitative restriction by the same action. Production percentage directives were also removed on all truck tubes. All of these steps were taken to increase the number of tires and tubes badly needed for civilian replacement.

Included among the series of sweeping moves to facilitate the reconversion of industry and speed the flow of a wide variety of peacetime products into the hands of consumers, announced by WPB on August 21, was the revocation of regulations governing the manufacture and sale of rubber processing machinery and equipment (L-143-A) and all restrictions on the production of camelback (L-345). The question of spare tires for new cars was taken out of the hands of WPB by transferring such control to OPA under Amendment No. 109 to Ration Order 1-A (Tires).

The tire allotment plan governing the production of truck, bus, tractor, implement and industrial tires was revoked on September 7 with the revocation of Appendix IV to Rubber Order R-1. This step eliminates the requirement that manufacturers of original equipment obtain a tire allocation from WPB. The action, however, does not apply in any way to airplane, passenger car, or motorcycle tires.

Rationing of industrial rubber footwear ended with the revocation of Ration Order 6A (Men's Rubber Boots and Rubber Work Shoes), effective September 5. Six types of such footwear were previously rationed, namely, hip height boots, above knee height boots, below knee height heavy boots, below knee height light boots, mine pacs, bootees and other footwear in this class 10 inches or more in height, and pacs, bootees and work shoes below 10 inches in height. Production schedules for 1945 call for approximately 3,000,000 pairs of these six types of footwear and actual production reached approximately 1,300,000 pairs in the first six months of the year.

Restrictions on the use of automotive-type tires on certain types of farm machinery were removed on August 14 by an amendment to Limitation Order 257-C. Heretofore the use of automotive-type tires was restricted to a limited number of items and certain other types of farm machinery were permitted to use implement tires. It is these items which are now permitted to use automotive-type tires. Rationing of all farm-implement and industrial type tires ended on August 20.

Wartime restrictions affecting butane and propane were removed on August 24 with the revocation of Limitation Order L-86 and Directions No. 1 and No. 2 of that order.

The nationwide 35-mile-an-hour speed limit was lifted by the Office of Defense Transportation on August 18. The original order (General Order ODT-23) was issued on September 26, 1942, as a tire conservation measure, following the recommendation made by the Baruch Rubber Committee.

Appendix V to Rubber Order

Under the provisions of Appendix V to Rubber Order R-1, issued on August 13, natural rubber must be separated from synthetic rubber for shipment to reclaimers. The appendix prohibits splitting (separation of parts of the tire) unless the splitter sorts and packs natural rubber, synthetic rubber and recapped tire parts separately. It also prohibits the sale of unsorted tire parts on and after September 1 and their purchase by a reclaimer barred on the same date. All splitters of scrap tires who shipped 100 tons or more of tire parts or had an inventory in excess of 100 tons during the first quarter of 1945 are now required to file monthly reports with WPB's Rubber Bureau.

Official Cut-Backs Completed

Completing cut-backs of additional plant capacity the Rubber Bureau announced on August 23 that Federal sponsorship of 13 military truck tire expansion projects has been withdrawn. Sponsorship of 12 expansion projects for the manufacture of soles and heels and 5 projects covering miscellaneous products was withdrawn at the same time. Although this action will have little effect in some instances because the projects were completed or nearly completed, it was taken to prevent the additional expenditure of Federal funds.

The 13 tire expansions which were authorized last Winter would have cost $20,000,000 if completed and would have provided additional manufacturing facilities for some 1,700,000 large truck tires annually. The tire projects affected in this latest cut-back were those to have been operated by the following companies, plant locations being indicated in parentheses: Armstrong Rubber (West Haven, Conn.), Armstrong Tire (Natchez, Miss.), Firestone (Akron and Memphis), Goodyear (Topeka, Kan.), Lake Shore Tire (Des Moines), Mansfield Tire (Mansfield, Ohio), Master Tire (Findlay, Ohio), McCreary Tire (Indiana, Pa.), Norwalk Tire (Norwalk, Conn.),

Pacific Tire (Oakland, Calif.), Pharis Tire (Newark, Ohio), and Seiberling Rubber (Akron). Prior to the cut-back, initial production had been started at the plants operated by Armstrong Rubber, Firestone, Lake Shore Tire, McCreary Tire and Pacific Tire.

In announcing the cut-backs, WPB made it clear that companies that were to be agents of the government in operating the new plants are free to negotiate with the Reconstruction Finance Corporation for the acquisition of the now canceled facilities. No estimate was given as to the amount of money already spent or the amount that the government may recover from the sale or lease of the plants and equipment involved.

Of the heel and sole expansions, only one, which was to be operated at Wadsworth, Ohio, by the Bearfoot Sole Co., was canceled by the action taken on August 23. This plant was only about 20% completed while the other 11 projects were completed and in full or partial operation. Companies and locations involved in these 11 completed projects are: Atlantic Tubing & Rubber (Providence, R. I.), Avon Sole (Avon, Mass.), Danbury Rubber (Danbury, Conn.), Endicott-Johnson (Johnson City, N. Y.), Essex Rubber (Trenton), Goodrich (Clarksville, Tenn.), Holtite Mfg. (Baltimore), Monarch Rubber (Baltimore), O'Sullivan Rubber (Winchester, Va.), Panther-Panco Rubber (Chelsea, Mass.), and Plymouth Rubber (Canton, Mass.).

The 5 expansions for miscellaneous products from which government sponsorship has been withdrawn are all completed and in operation. They are: Akron Standard Mold Co., Akron (tire building drums and tire plant equipment); Stewart Bolling & Co., Cleveland (hydraulic vulcanizing presses and heavy rubber machinery); Sannette Mfg. Co., Carlstadt, N. J. (pressure industrial sensitive tape); Resistoflex Corp., Belleville, N. J. (low-pressure aircraft hose); and Sun Rubber Co., Barberton, Ohio (extruded products, fuel cell fittings and miscellaneous rubber molded items).

One of the government rubber manufacturing plants in the expansion program was officially put on the block by the Reconstruction Finance Corporation on August 21. This is the inner tube plant located at Tuscumbia, Ala., which is nearing completion and which is expected to be ready for operation by October 1. The plant, built completely with Federal funds, was to have been operated by the Robbins Tire & Rubber Co. Information pertaining to the sale or lease of this plant may be secured from the RFC office in Birmingham, Ala.

Advisory Committee Meets

A meeting of the Rubber Industry Advisory Committee was held in Washington late in August. The committee was told by WPB and OPA officials that rationing of tires should remain only as long as the difference between supply and demand makes ordinary distribution without rationing impossible. Truck tires probably will be removed from rationing before passenger tires and new cars will be supplied with only four tires so long as tires still are needed for rolling wheels now on the road. It was emphasized that rumors that had been sweeping the country that rationing of certain categories of tires would be lifted immediately are completely unfounded.

The committee was given tentative tire and tube production schedules through 1946. They call for 66,000,000 passenger automobile and motorcycle tires in 1946, an all-time high. The previous peak output was 53,000,000 in 1941. In the last three months of this year 11,774,000 are scheduled. Of next year's total, 44,000,000 will be available for civilian replacement and export.

Planned truck and bus tire production is 4,480,000 in the fourth quarter of this year and 15,380,000 next year. For airplane tires, the comparable figures are 59,000 and 211,000; for tractor and implement tires, 860,000 and 3,375,000; for bicycle tires, 1,800,000 and 8,000,000.

Cotton tire cord production still is running behind estimated needs, the committee was told. Domestic needs are programmed at 252,000,000 pounds against a rated capacity of 320,000,000 pounds, but current production is at a rate of only 20,000,000 pounds because manpower shortages still exist. Estimated United States consumption of high-tenacity rayon cord in 1946 is 185,000,000 pounds. The industry has capacity for 240,000,000 pounds, and it is expected that about 200,000,000 pounds will be produced.

Rosins, of which synthetic rubber and rubber manufacturing employ about 10 per cent of total production, will remain below demand for some time. Every effort will be made to have sufficient rosin allocated to the rubber industries to avoid limiting production, WPB officials said.

Carbon black needs for 1946 are estimated at 977,000,000 pounds, with present annual production about one billion pounds.

Consideration of the post-war supply of natural rubber was shelved by the committee until definite information is received from the liberated areas of the Far East. Committee members agreed that until this information is available and until some knowledge is gained of what the additional supplies of natural rubber will cost, it is impossible to determine the amount of synthetic rubber that will be required by the industry. A program for improving the quality of certain products when increased supplies of natural rubber become available was outlined. The committee also recommended the removal of rubber footwear from rationing.

During the course of the meeting it was revealed that the Rubber Bureau has recommended that all government-owned manufacturing facilities be kept in production as long as tire rationing remains and perhaps for some time thereafter.

Policy Committee Formed

Announcement of the organization of an Inter-Agency Policy Committee on Rubber was made on September 8 by John W. Snyder, Director of War Mobilization and Reconversion. The committee, the major function of which will be to formulate a coordinated national policy on rubber, is headed by William L. Batt, WPB Vice-Chairman. Members of the committee will include representatives of the Office of War Mobilization and Reconversion, the State, War, Navy and Justice Departments, and the Surplus Property Board. WPB will work in close cooperation with it.

A four-point program for the newly organized Policy Committee was outlined by Mr. Snyder: (1) The committee is directed to survey plans and programs of the agencies for the maintenance of a synthetic rubber industry; (2) The maintenance of stand-by rubber plants and the disposal of surplus rubber plants; (3) The encouragement of rubber research and development and the establishment of a strategic stockpile of rubber; and (4) The development of wild and cultivated natural rubber in South America and the establishment and maintenance of a mutually advantageous program for importing natural rubber from the Far East.

In announcing the formation of the committee, Mr. Snyder emphasized the fact that there may be a serious surplus of rubber within the next few years and accordingly "the national defense needs of the United States and the maintenance of stabilized economies here and in producing areas abroad require the adoption of a coordinated United States policy with regard to rubber." He added that it was essential that such a policy "provide for an adequate supply of rubber—both natural and synthetic—to satisfy the strategic requirements of the United States." He also stated that the Policy Committee had to provide for expanding supplies of natural and synthetic rubber at reasonable and stable prices and encourage research and development with respect to synthetic rubber—all with a minimum of interference to international trade.

One of the problems which the new Policy Committee will probably have to face is the question of continued subsidy in the United States of synthetic rubber. Although restriction regulations on the consumption of all synthetics with the exception of Butyl rubber have been completely lifted, no changes in the price structure have yet been made and GR-S continues to be sold at 18½c a pound for civilian end products.

Carbon Black Situation

At the recommendation of the Rubber Bureau, steps have been taken by the WPB Chemicals Bureau for the cancellation of three projects intended to increase the annual output of channel black. Two of these projects called for expansions of facilities involving the use of Federal funds. These two would have been operated by the Cabot Carbon Co. at Eunice, New Mexico, and by the Jefferson Lake Sulfur Co., at Clemons, Texas. The third project was a contemplated pipe line for the C. E. Johnson Co., at Stonewall, Okla., which also

would have been government financed. No construction had been started at any of these projects.

Current production of carbon black is estimated at 122,000,000 pounds monthly, this production including that from all wartime facilities, which are all now in production with the exception of two recently installed units. While the supply situation has improved tremendously since the period of critical shortages in the early part of the war, producers predict that some tightness in supply may prevail for the next several months. This prediction is based on the fact that the compounding of synthetic rubber calls for considerably larger quantities of carbon black than does natural rubber.

Carbon black inventories are in fair shape at the moment but manufacturers express the belief that it should be enlarged somewhat to assure continued supply until such time as natural rubber begins to reach the United States in increasing volume.

Reconversion Activities

Reconversion is, of course, the order of the day for the entire rubber manufacturing industry as it is in all industries. As pointed out previously, the rubber manufacturing industry does not face the same reconversion problems that affect other non-durable goods industries. Manpower still remains the No. 1 issue.

According to John L. Collyer, president of the B. F. Goodrich Co., and former Special Director of Rubber Programs, the rubber industry will have employment levels lower than for peak war production but substantially greater than before the war. Goodrich, for example, expects to have work for about 30% more men and women in 1946 than in 1940. Officials of the U. S. Rubber Co. have stated that that company expects to stabilize employment in its five tire plants around 20,000, as compared with 14,000 before the war. Like most rubber companies, U. S. Rubber is fast swinging over to 100% civilian production.

RECONVERSION PRICING METHODS SET FOR SOME RUBBER PRODUCTS

Reconversion pricing methods were given to producers of a wide variety of mechanical fixtures used in home and office construction, and to producers of some machinery and rubber items, by OPA on August 13. The methods are covered in Amendment No. 2 to Supplementary Order 118 and Amendment No. 2 to Supplementary Order 119. Rubber products covered include bookcloth (except artificial rubber); oilcloth; rubber-covered rolls; rubber flooring, mats and matting; sponge rubber goods under M.P.R. 149 and M.P.R. 220; and window shade cloth, when processed for window shade use.

All of the rubber products listed come under the heading of "reconversion products," i.e., having been almost entirely out of production during the war. Manufacturers of such items will be eligible for industry-wide price formulas to be issued shortly in line with OPA's policy of giving uniform, over-all reconversion price treatments to industries that have been entirely or largely engaged in war work. These formulas will reflect the entire industry-average profit margin during the 1936-39 period.

In the meantime, if any manufacturers of the items specified are ready to resume civilian production in advance of other members of their industry, they may come in under the reconversion pricing provisions established by OPA. Furthermore, if an industry-wide increase proves to be inadequate for a manufacturer, he may obtain an adjustment under the two amendments.

Manufacturers of the specified rubber products come under the individual price adjustment provisions contained in the three reconversion pricing orders of July 23, 1945, under which reconverting manufacturers calculate their individual ceiling prices by applying a profit margin, supplied by OPA, to their "adjusted 1941 costs." Thus, each manufacturer's ceiling prices will be individually computed and based in each case on the company's own factory cost experience since 1941. Manufacturers of "reconversion products" may apply to their district or regional OPA office for a reconversion price without showing that their production of the specified items has been curtailed because of the war. Other types of manufacturers must establish their eligibility as "reconverting manufacturers."

Profit factors applicable to "adjusted 1941 costs" for each item, or group of items, being priced under the new actions will be published from time to time. In every case the factor will equal one-half the average industry-wide profit margin over costs for the representative peacetime years 1936-39. If any manufacturer is ready to file his application for a new price before the applicable profit factor is published, he may obtain the factor promptly from his district or regional OPA office.

In the meantime, large volume manufacturers will establish individual reconversion prices as follows: To the total 1941 costs of the items in question (including all overhead) they add: (1) legal increases since that time in wage-rate schedules of factory workers, and (2) the general increases in ceiling prices of materials used. This gives an "adjusted 1941 cost" figure. To this figure is applied the profit factor supplied by OPA, and the result is the firm's basic reconversion ceiling price. Additions and subtractions are to be made from this price on sales to various classes of customers, so that selling practices will be in line with those of the pre-war period.

Small volume manufacturers (doing an annual business of between $50,000 and $200,000) follow the same general procedure with the following exceptions: (1) These manufacturers may add legal increases in straight-time wage rates (rather than in basic wage rates) of factory workers, to 1941 costs, (2) they may add their own actual legal increases in material costs (rather than the general increase) to 1941 costs, and (3) they may take as a profit margin their own average margin over total costs for the years 1936-39 (instead of the profit factor supplied by OPA) if they wish. Ceiling prices submitted to OPA by these manufacturers go automatically into effect 15 days after submittal, unless the manufacturer hears from OPA to the contrary.

Manufacturers doing an annual business amounting to less than $50,000 may calculate reconversion prices under the liberalized methods described in the application form specially prepared for very small manufacturers, OPA said. Few if any manufacturers in this size group, however, are expected to apply as "reconverting manufacturers" under the new actions.

Additional regulations of direct interest to the rubber manufacturing field issued in recent weeks included the following:

RUBBER FOOTWEAR

All civilian sales of domestic and imported waterproof, canvas and other vulcanized rubber footwear have been placed under the regular rubber footwear regulations covering sales by manufacturers, wholesalers and retailers. No increases in the prices at any sales levels are expected to result from this action, accomplished by Amendment No. 10 to M.P.R. 132 (Rubber Footwear) and Amendment No. 2 to R.M.P.R. 229 (Retail and Wholesale Prices for Rubber Footwear). Both amendments were effective August 29. Some types of rubber footwear were previously covered by the General Maximum Price Regulation.

Manufacturers' maximum prices for rubber footwear seconds have also been established by requiring each manufacturer to grant the discounts for seconds that he had in effect during the base period, December 3, 1941. If the price so arrived at is higher than 90 per cent of the price of rubber footwear firsts, to the same class of purchaser, the manufacturer is required to reduce his price so that it will be not more than 90 per cent of the first price.

Wholesalers' maximum prices for vulcanized rubber footwear seconds are 90 per cent of the maximum price for the firsts to the same class of purchaser. Retailers, in pricing seconds, are allowed a gross margin of 35 per cent. An OPA study shows that this is the gross margin that retailers generally secured for seconds during the base period. Wholesalers and retailers are provided with a method of applying for maximum prices in the case of rubber footwear that cannot be priced by any other section of the

regulation. Any prices established through application will be prices in line with these already contained in the regulation.

The provisions of the regulation relating to imports are broadened to include imports from every country, made from either synthetic or crude rubber. Previously, only natural rubber canvas shoes from Cuba had been priced. Wholesaler-importers are to price their imported rubber footwear by using the same list prices, discounts and differentials they used when pricing domestically produced footwear. These prices, however, may be increased upon application to OPA, if the retailers are willing to absorb the increase.

HEELS AND SOLES

Shoe repair shops are now permitted to charge 5 to 15 cents a pair over their regular ceiling prices for the soling of shoes when they use neolite or brown composition, rubber or fiber soles, according to Amendment No. 3 to Supplementary Service Regulation 47 to M.P.R. 165 (Retail Shoe Repair Services). The additional charges are to compensate the repair shops for the higher costs of these materials.

Neolite is an entirely new material, while brown composition, rubber or fiber soles are similar to brown soles of these types sold before the war, except that synthetic rubber is now used in place of natural rubber. During the war repair shops used either leather or black composition, rubber or fiber, soles.

In the case of neolite half soles, shops may add to their legal ceilings for semi-fine leather half soles 10 cents a pair for men's and larger boys' sizes and five cents a pair for all other sizes. For brown composition, rubber or fiber, half or full soles, an addition of 15 cents a pair is permitted over the legal ceiling price for black composition, rubber or fiber, soles.

COATED FABRICS

Wholesalers and converters have been provided with new formula methods for determining ceiling prices on their sales of coated and combined fabrics. The new methods, covered in Amendment No. 5 to M.P.R. 478 (Coated and Combined Fabrics), originally scheduled to be effective on August 13, but later changed to August 27 by the issuance of Amendment No. 6 to the order, provide uniform margins, as contrasted with varied individual "freeze" margins heretofore in effect. They are also expected to facilitate the establishment of ceilings for new converters and wholesalers. By establishing uniform margins at an average level, and by clearly defining costs, the new methods are expected to result in an over-all slight reduction in current prices.

SCRAP RUBBER

Ceiling prices for rubber peelings from recapped or retreaded tires have been reduced 15% to bring them to the level of prices generally being paid for such peelings. This action, accomplished in Amendment No. 13 to R.P.S. 87 (Scrap Rubber), effective September 1, applies to sales by splitters of tires to reclaimers and scrap rubber organizations.

At the same time, the ceilings for peelings, as well as for S.A.G. scrap rubber, have been relisted according to the sales groups recently established by WPB. There will now be three groups of peelings—natural, synthetic and recap or retread—and two groups of S.A.G.—natural and synthetic. Ceilings for natural and synthetic peelings and S.A.G. remain unchanged.

The amendment also establishes specific ceilings of one cent a pound for scrap rubber cement and for defective patches and reliners on sales to industrial consumers. It also restates the established ruling of OPA that new tires slashed by manufacturers or brand owners because they are not usable, and used tires and tubes so worn out as to be no longer usable, will take the ceilings already provided for scrap tires and tubes. This rule applies regardless of the purpose for which such items may have been acquired and regardless of repairs and reconditioning treatment given them.

TIRE SPLITTING

Charges for splitting tires may be made on adjustable pricing basis pending establishment of uniform dollar-and-cent ceiling prices for such services, OPA announced on September 4. Charges for this service were frozen at March, 1942, levels, but based on requests for an increase in prices OPA established the adjustable pricing basis until it completes studies on fair and equitable specific maximum prices. The adjustable pricing method is contained in Order 46 under Section 17 of R.M.P.R. 165 (Authorization of Sales at Adjustable Maximum Prices). Actual payments in the meantime cannot be made above present ceilings, but if the new ceilings to be established are higher than the present ceilings, the difference may then be collected.

EARLY SHIPMENT OF NATURAL RUBBER ANTICIPATED FROM THE FAR EAST

Victory over Japan means that the critical world shortage of natural rubber will be considerably eased within the next several months, and unless unforeseen circumstances occur supplies of natural rubber should reach a normal position by the middle of 1946. Initial reports received from the rubber-producing areas in the Far East are quite encouraging and indicative of early shipments.

The following information on the status of natural rubber in the major rubber producing areas in the Far East is based largely upon statements made by officials of various governments as reported in the daily press:

Malaya—Stockpiles of natural rubber are estimated at varying sizes of from 50,000 to 200,000 long tons. Rubber experts from the British Ministry of Supply arrived in Singapore on September 8 to study the situation carefully and a report will probably be available within the next few weeks. A three-member American liaison group, composed of former Singapore representatives of American companies, will cooperate with these experts.

Netherlands East Indies—A stockpile of approximately one year's production, which would indicate a stockpile of approximately 350,000 tons, is estimated. The rubber plantations are reported to be in excellent shape. A government fund to promote production and the largest possible exports has been created, to be managed by a committee representing the government and the rubber estates. The Association for Estate Rubber Culture has also been established and production from the estates and its domestic transport will be handled by the Association. Among other things the Association will establish geographical sections of production, will coordinate the sectional plans, and will also decide which estates are to be admitted.

French Indo-China—A stockpile of 150,000 tons of rubber has been located in Saigon.

Thailand (Siam) — Although some damage to rubber stockpiles in Bangkok is reported, approximately 50,000 tons are believed available for immediate shipment.

According to Dr. Pieter Honig, well-known Dutch rubber technologist and government official, rubber will be shipped to consumer nations from the Netherlands East Indies within the next three months. It is now known that local planters have been hoarding their output for several years, although full tapping has not been done since the 1942 invasion. According to estimates of the Dutch government, plantings amount to some 4,750,000 acres in the islands of Java, Sumatra and Borneo, the leading rubber producing areas in the Archipelago.

One possible bottleneck in getting rubber out of the Netherlands East Indies may be shipping. A contract has been placed by the Rubber Development Corporation with the Odenbac Shipbuilding Corporation of Rochester, N. Y., for 60 tugs and barges to be used in the Netherlands East Indies. These vessels will be used largely in shallow waters in collecting natural rubber from the interior of the islands. It is also known that the War Shipping Administration has been working on plans for some time for the converting of petroleum tankers for transporting latex. The ports of Balikpapan in Borneo and Soerabaya in Java are reported to be in good shape.

Prior to the Japanese surrender, the

N.E.I. Government had begun the purchasing of some $15,000,000 worth of rubber plantation equipment, particularly washing and ribbing machinery. This amount represents approximately 25% of the total value of all rubber plantation equipment in the Indies prior to the outbreak of global warfare. This equipment will be sent to the rubber-producing areas in the quickest possible time.

According to one estimate reported in the daily press, approximately 250,000 tons were produced annually in Malaya during the Japanese occupation. The Japanese are believed to have consumed a larger portion of the output of this region than from any of the other rubber-producing areas. Although some damage was done to the rubber plantation region in Malaya during the Japanese invasion, it is reported that the damage has since been repaired to a sufficient degree to allow for a high level of production.

Based on these reports, it seems evident that a production of more than 800,000 long tons of natural rubber can be expected from the rubber-producing areas in the Far East during 1946, of which 250,000 to 300,000 tons would come from Malaya, 385,000 tons from the Netherlands East Indies, 100,000 tons from Indo-China, and 50,000 to 75,000 tons from Thailand. If the later investigations prove that the plantations are in as good shape as the initial investigations indicate, then a production of more than 1,000,000 tons of natural rubber might be forthcoming during 1946. High yields are anticipated from rubber trees which have not been tapped for the past three years.

Cancel Four Guayule Mills

Since the end of the war against Japan has improved the outlook for natural rubber considerably, WPB has withdrawn its sponsorship of four additional mills for the processing of guayule shrubs, according to a statement made by R. S. Wilson, Special Director of Rubber Programs, on August 25. These mills, which were to have been built and operated by Firestone, were to be located at Bakersfield and Patterson, Calif., two at each locale. Firestone, it is reported, has no interest in completing or using these mills itself.

According to Mr. Wilson, harvesting and processing of the guayule shrubs will continue but no new plantings will be made. Processing will take place at existing mills at Salinas and Bakersfield, Calif. Cancellation of the four additional mills is expected to result in a saving of approximately $4,000,000.

The Guayule Emergency Rubber Project now reverts to the program in effect prior to the decision to expand the processing of the shrub. The U. S. Department of Agriculture, through its Forest Service, will continue to operate the processing mills at Salinas and Bakersfield, which is the program for which funds were approved in the appropriation bill of the Department of Agriculture for the fiscal year of 1946.

ESTABLISH CEILING PRICES ON NEW AIRCRAFT TIRES AND TUBES

Retail dollar-and-cent ceiling prices for new aircraft tires and tubes have been established by OPA. A method for determining maximum prices at the wholesale level for such tires has also been determined. These actions are covered respectively in Amendment No. 3 to R.M.P.R. 528 (Tires and Tubes, etc.) and Amendment No. 8 to R.M.P.R. 143 (Wholesale Prices for New Rubber Tires and Tubes), both effective August 23.

The amendment to R.M.P.R. 528 lists the retail dollar and cent prices for new airplane tires and tubes according to type, size and ply, and according to type of rubber—natural, synthetic or reclaimed. According to the amendment to R.M.P.R. 143, wholesale sellers, other than manufacturers and brand owners, will figure their maximum prices by deducting 24% for new airplane tires and 25-5% for tubes from the dollar-and-cent maximum retail prices. Manufacturers and brand owners will use their January, 1945, percentage discounts for these tires and tubes. The maximum retail and wholesale prices, determined by the new methods, will be approximately 6% less than the ceiling prices previously in effect.

The amendments also remove gum covered patches made from fuel cells, double cushion patches, and criss-cross patches from coverage of the dollar-and-cent prices previously established. Retailers will be notified by their suppliers regarding the retail ceilings of these repair materials. The maximum price for repair materials covered by the regulations that do not meet the minimum quality specifications remain at one cent a pound on sales to all buyers other than industrial consumers, prices for the latter being covered in R.P.S. 87.

Two additional changes made by the amendments at the wholesale level, effective August 23, were as follows:

A new optional method by which a manufacturer may establish his maximum prices to a brand owner for new tires of all types is added to the regulation. By this method, "if the manufacturer and brand owner agree, the maximum price of the manufacturer's lowest price class buyer of the manufacturer's own brand tire may be used as the manufacturer's maximum price to that specific brand owner."

Manufacturers' and brand owners' maximum prices for reclaimed rubber passenger car tires, and natural rubber passenger car and motorcycle tires and tubes, are to be priced by the same methods now in use for pricing all other passenger car and motorcycle tires and tubes. Since manufacturers and brand owners have practically none of these tires at the present time, this provision removes outdated pricing methods. When natural rubber tires are again sold by these sellers, a new pricing method will be needed to suit the circumstances and conditions of the times.

In addition to the above, several orders to R.M.P.R. 528 have been issued in recent weeks. Revised Order 36 establishes maximum retail prices for various sizes and types of tires made by Goodrich. Order 55 establishes similar prices for two types of farm tractor rear tires and two types of mud-and-snow tires. Order 56 establishes maximum retail prices for various sizes of new combat and run-flat tires of cotton construction.

Changes in Ration Order

Seven additional amendments to Ration Order 1A (Tires, Tubes, Recapping and Camelback) have been issued in recent weeks, as follows:

Amendment No. 103, issued July 31 and effective August 3, invalidated OPA Certificate R-2 after August 15, and established new transfer regulations.

Amendment No. 104, issued and effective August 10, was a clarification of the previous amendment, particularly with regard to the handling of transfer certificates.

Amendment No. 105, issued August 14 and effective August 17, removed used truck tires and truck tires requiring major repairs to be made serviceable from rationing. It also provided that dealers having reclaimed war tires in stock can request the OPA district director to reclassify such tires, which are branded "F-F" or "War Tire," as Grade III tires and sell them without rationing restrictions.

Amendment No. 106, issued and effective August 15, changed the effective date of Amendment No. 105 from August 17 to August 15.

Amendment No. 107, issued and effective August 17, established a new eligibility system for passenger car tires under which purchase certificates for new tires will be issued only to passenger cars used for occupational purposes and to those used for non-occupation purposes provided that the local board decides that denial of the application would cause undue hardship and that the total of certificates issued to non-occupational drivers does not exceed 5% of the board's monthly passenger car tire quota. The amendment also lifts the former ban against issuance of a certificate for a new tire to be used as an emergency spare if the applicant has serviceable tires for each of the running wheels of his car and permits issuance of purchase certificates for tires to be used on house trailers that serve as living quarters.

Amendment No. 108, issued on August 20 and effective August 21, removed tractor-implement and industrial tires from rationing.

Amendment No. 109, issued August 24 and effective September 1, established a

procedure under which all tire dealers may obtain substantial increases in their allowable inventories of rationed passenger and truck tires and under which any persons desiring to enter the tire business may obtain minimum inventories of 20 passenger tires, 12 small truck tires, and 6 large truck tires. It also simplified truck tire inspections, discontinued emergency truck tire boards, and further simplified the rationing regulations. Transfer of the restriction of spare tires on new automobiles to OPA was also accomplished by the amendment.

Quotas for September

September quotas of passenger car tires and truck and bus tires for civilian use, announced by OPA on August 30, were the same in total numbers as for August, *i.e.*, 2,500,000 passenger car tires, 386,862 small truck tires, and 200,000 truck tires size 8.25 and larger. The only important change in the number of tires allocated by WPB to OPA for September rationing was an increase of 20,000 in the truck and bus 10-ply tires, sizes 7.00-20 and 7.50-20, with a corresponding reduction in the remaining sizes in the smaller group.

According to OPA, the truck tire quotas for September will be inadequate to meet all demands, with the most acute shortage in the large truck tires and in two of the 10-ply categories—7.00 and 7.50-20. The eligible demand for most size truck tires, however, is not expected to exceed greatly the number available. Truck tires are now rationed under a preference list system similar to that used in passenger tire rationing, but based largely on the importance of the cargo handled. Passenger car, truck and bus tires are the only ones now being rationed.

To Open South African Plant

The Goodyear Tire & Rubber Co., Akron, has announced that it will establish a new rubber manufacturing plant at Uitenhage, Cape Colony, in the Union of South Africa, which will have an initial daily capacity of approximately 1000 tires. J. L. Nicholson, who has been in charge of South African sales for the company, will be managing director, and C. V. Hendon and Paul Stevens-King, both formerly of Goodyear's branch in England, will serve as secretary-treasurer and sales manager, respectively.

Guayule Production in U.S.S.R.

According to the Soviet press, the Caucasian republic of Azerbaidzhan in the Soviet Union is increasing the area under cultivation to guayule. During the current season, 2,000,000 new plants have been set out on a single large state farm, where a hectare of guayule had been found to yield three times as much as a hectare planted to kok-saghyz. The first factory in the Soviet Union for the processing of guayule is reported to have been under construction last March.

Recent DuPont Appointments

The Rubber Chemicals Division of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has announced the addition of four new members to the staff of its Rubber Laboratory. The additions include the following: A. Russel Brooks, a mechanical engineer formerly employed by the Explosives Department of the company; Webster Day, who has served as a chemical engineer with the B. F. Goodrich Co., the Standard Oil Co., and the Boston Woven Hose & Rubber Co.; John B. Ledden, a chemist who has been employed by the company's Plastics Department and by the Explosives Department; and Embert L. Stangor, who has served as a chemist with both the Chicago Belting Co. and the Featheredge Rubber Co.

New Amecco Plasticizers

The commercial availability of four new plasticizers has been announced by Amecco Chemicals, Inc., 60 East 42nd St., New York 17, N. Y. They are: Plasticizer No. 7-2, Plasticizer No. 11-2, Plasticizer No. 8, and Paroil 177-K. These new materials are particularly recommended by the company as plasticizers for the vinyl copolymers, but they are also said to be of interest in combination with other plastics and resins and in synthetic rubber. They are all insoluble in water and are compatible with most commercially available resins and elastomers. A bulletin comparing the new plasticizers with dibutyl and dioctyl phthalates and tricresyl phosphate in Vinylite VYNW has been made available by the company.

Nylon Used in Mareng Cell

The Glenn L. Martin Co., Baltimore, Md., has revealed that a device known as the "Hidden Barrier," a layer of nylon thinner than the finest stocking ever spun, has been employed in the construction of its Mareng self-sealing fuel cells. Sandwiched between the layers of synthetic rubber which form the flexible walls, it is said to be the only practical means yet devised for preventing high-octane or aromatic gasolines from escaping through the walls of the cell. Usually sprayed on in liquid form, the "Hidden Barrier" solidifies into a thin membrane, which preserves the cell's flexibility and, being buried, is not subject to abrasion.

General Reorganizes Sales Unit

General Tire & Rubber Co., Akron, has announced the reorganization and expansion of its sales department in preparation for postwar sales activities. New division heads include Karl A. Dalsky, manager of truck tire sales; J. E. Powers, manager of automobile tire sales; J. C. Ink, manager of sales operations; E. C. Leach, manager of recapping and tire accessory sales; R. H. Harrington, manager of advertising and sales promotion; and S. S. Berry, manager of battery and special item sales.

Complete New York Program

The Fall Meeting of the New York Rubber Group, to be held on Friday, September 21, at the Building Trades Club, 2 Park Avenue, in New York City, will feature reports on German methods of processing synthetic rubber by three members of the American Technical Mission which recently visited Germany to uncover such information. A. H. Nellen (Lee Rubber) will discuss German synthetic tires and mechanical goods, R. A. Schatzel (Rome Cable) will treat with wire and cable insulation, and W. L. White (Manhattan Rubber) will give a general picture of the synthetic rubber situation in Germany during the war. As usual, the technical program will start at 4:30 P.M. After dinner, a technicolor film on "Mining and Milling of Asbestos Fibers" will be presented through the courtesy of the Johns-Manville Corp., accompanied by a descriptive narrative furnished by Simon Collier, manager of that company's inspection and control department. Tickets for the meeting are $2.50 each, and may be secured from the secretary of the group, B. B. Wilson, c/o *India Rubber World*, 386 Fourth Ave., New York 16, N. Y.

Stanco Appoints Representatives

Stanco Distributors, Inc., New York City, has announced the appointment of two new technical representatives. Thomas C. Edwards, formerly technical superintendent of the Davidson Rubber Co., will handle the New England territory, operating out of Boston, and William M. Moser, formerly chief chemist of the Armstrong Tire & Rubber Co., will handle the Ohio territory, operating out of the First Central Tower in Akron. Additional appointments are expected to be announced shortly.

Acquires A. C. Horn Co.

The General Printing Ink Corporation has acquired the A. C. Horn Co., of Long Island City, N. Y., producer of paints, varnishes and allied products, including chemical specialties for the rubber, plastic and allied industries. The acquisition was reported to be the first step in a general expansion program planned by the ink concern, which is planning the early construction of a consolidated research laboratory in the New York metropolitan area.

Chicago Meets October 12

The Chicago Rubber Group will open its 1945-46 season with a meeting at the Morrison Hotel, Chicago, on Friday, October 12. The principal speaker will be Vern Smithers, of the V. L. Smithers Laboratories, Akron, who will give a talk on "The Application of High Frequencies to Heating and Vulcanizing Rubber." The program will also include a talk arranged especially for non-technical members of the group.

GOVERNMENT RUBBER STOCKPILE PROPOSED BY JOHN W. THOMAS

Asserting that preparedness might well serve as a preventive of war in the future, John W. Thomas, chairman of the Firestone Tire & Rubber Co., Akron, has proposed the creation of a large Government-owned stockpile of natural rubber and continuance of a broad research program in the field of synthetic rubber. Acquisition of such a stockpile, Mr. Thomas said, could be started as soon as the accumulated needs for synthetic and natural rubber products have been met.

Plantation rubber, Mr. Thomas stated, is the most suitable for stockpiling because it is most nearly an all-purpose rubber; it can be stored for long periods without serious deterioration; it is relatively economical to store, and it would need rotation only at long intervals. He also pointed out that even in the last days of World War II, despite the swift progress of the synthetic rubber industry, the minimum requirement of natural rubber was 14 per cent of total rubber consumed.

Suggests 15 Month Supply

Discussing the size of the proposed stockpile, Mr. Thomas said that the reserve should be adequate to meet emergency military and civilian needs for 15 months—the time that would be required to build additional synthetic rubber plants, if needed—and also should be sufficient to supply minimum essential needs of natural rubber for natural-and-synthetic-rubber compounds for five years. A safety factor also should be added to allow for unforeseen contingencies.

"As a further factor of safety, each manufacturer should be pledged to maintain in this country a working minimum inventory of natural rubber," Mr. Thomas continued. "This minimum should perhaps be a 60-day average of requirements for rubber of this type. Since the stockpile would be a national resource to serve the country as a whole, it follows that it should be owned and operated by the United States Government."

The Firestone executive suggested that the stockpile rubber be stored in igloo-type magazines now used for storage at 30 munitions depots, scattered throughout the country. These units, he said, would provide ideal storage for ribbed smoked sheet plantation rubber because temperature, humidity and ventilation in them are highly suitable for the purpose, and their maintenance cost is low. Each "igloo," which could accommodate 200 tons of rubber, is sufficiently isolated from others to provide a high degree of safety from fire.

In commenting on the synthetic rubber industry, Mr. Thomas stated that the potentialities of synthetic rubber have not yet been fully realized, and that wartime experience indicates that continued research will develop new types of rubber, fitted for special uses, better than present types. It is also believed that continued research will lower the costs of production as well as facilitate the manufacture of synthetic rubber into finished products.

"Clearly, then, this research should be carried on so that, in the event of another war emergency, we may be prepared to become self-sufficient in rubber in a minimum of time and with a maximum of effectiveness," he said. "The military services should have a proper place in shaping the course of this program. A part of the work could be carried on in the present Government-owned Synthetic Rubber Evaluation Laboratory in Akron."

Mr. Thomas asserted that it was impossible at present to predict how the future rubber requirements in this country will be divided between natural and synthetic rubber, but added that the synthetic rubber industry would make a large contribution to the rubber business and American economic life in the years to come.

Coming Events

Sept. 21. N. Y. Rubber Group, Building Trades Club, New York City.

Sept. 28. Philadelphia Rubber Group, First Annual Outing, Oak Terrace Golf Club, Ambler, Penna.

Sept. 28. Boston Rubber Group, Copley Plaza Hotel, Boston.

Oct. 2. Los Angeles Rubber Group, Mayfair Hotel, Los Angeles, Cal.

Oct. 12. Chicago Rubber Group, Morrison Hotel, Chicago, Ill.

Oct. 30. Detroit Rubber & Plastics Group, Detroit-Leland Hotel, Detroit, Mich.

Boston Meets September 28

The Fall Meeting of the Boston Rubber Group will be held on Friday, September 28, at the Copley Plaza Hotel, in Boston, Mass. Dinner will be served at 6:30 P.M. The speaker will be J. H. Faull, Jr., head of polymer research for the General Latex & Chemical Co., Cambridge, Mass., who has been serving as technical director of the government-owned synthetic rubber plant at Baytown, Texas. Mr. Faull will discuss the "GR-S Black Masterbatch Process." Tickets to members are $3.50 each.

Article on Dr. W. A. Gibbons

An interesting biographical article on the life and work of Dr. Willis A. Gibbons, director of research of the U.S. Rubber Co., and current chairman of the Division of Rubber Chemistry, A.C.S., appears in the October, 1945, issue of *The American Magazine*. Some of the research directed by Dr. Gibbons in the fields of rubber thread, tires, coated fabrics and, more recently, fabrics from chicken feathers, is outlined, intermingled with anecdotes.

WALSH REPORTS ON RESULTS OF ARMSTRONG TESTING FLEET

The tire testing fleet maintained by the Armstrong Rubber Co., West Haven, Conn., at San Antonio, Tex., has been constantly expanded and has made many important contributions to the wartime development of tires and tubes, according to a recent statement by James A. Walsh, president of the company. The test fleet, which now operates 14 passenger cars on a 24-hour-a-day basis, is capable of testing approximately 2400 tires a year and serves as a field laboratory for the company.

In explaining the methods Armstrong employs in testing tires, Mr. Walsh placed particular emphasis on the fact that at no stage of the testing operations are the tires coddled. Most of the cars are given a smaller size tire than would normally be placed on the vehicle, and, in addition, the tires carry a lower air pressure than normal, while the cars carry as much as 1200 to 1500 pounds dead load.

Once the test is under way, the tires are used on both paved and gravel roads 24 hours a day. On the former, a speed of approximately 60 m.p.h. is maintained throughout. On gravel roads this speed is slightly lower. In most cases, the tires are run until they reach the smooth stage, though they are sometimes run until the fabric shows through or until they are forced to blow out after thousands of miles of gruelling service. The only pauses in the testing operation occur when drivers pull up at 75-mile intervals to check air pressures, or when they make a specified number of brake stops per hour, bringing the vehicle to a dead halt by applying the brakes at high speed.

To assure equal distribution of rubber wear, tires are rotated on the car every 1000 miles. Every 2000 miles, they are removed from the car and deflated, and the inner carcass is minutely examined on a giant pneumatic spreading machine, while the tread depth is measured to the thousandths of an inch at thirty predetermined points on the tire. Different types of road tests are undertaken to prove different things. For example, a certain type of road test may be undertaken to test the sidewall construction, while another is made to test the tread on paved or on gravel roads. Synthetic rubber, reclaimed rubber, truck tires and recaps, as well as natural rubber, are tested by the fleet.

The fleet has now grown to the point where it requires a staff of 54 people and costs several hundred thousand dollars a year. Every week each car of the fleet travels a distance equivalent to a round-trip run from coast to coast, and the yearly total for the fleet is 3,500,000 miles. The fleet burns out a set of high quality tires in about three weeks, and more than a quarter of a million gallons of gasoline are consumed each year. Despite constant servicing, the cars themselves are ready for the scrap-heap in periods ranging from six to eight months.

DETAILS OF R.G.A. SCHEME TO RESTORE MALAY ESTATES

In an address by T. B. Barlow, chairman of the Rubber Growers' Association, London, recently reported in RUBBER AGE, reference was made to the prospective formation by the R.G.A. of a Malayan Rubber Estate Owners' Co. Since then, the approval of the British Government has been obtained, and the R.G.A. has now issued its complete plans for setting up this organization as the chief instrument for restoring the Malayan estates. The plan is a short-term scheme only, being designed to increase the rubber output immediately following the liberation of Malaya. It is also designed to cover the needs of all plantation owners, irrespective of nationality or domicile. Features of the scheme include the following:

The Malayan Rubber Estate Owners' Co. will be incorporated as limited by guarantee and without capital shares, and will be financed at first by a levy upon members amounting to one shilling per planted acre owned. Members will be required to give the organization authority to raise sums not exceeding one pound per planted acre owned. Purchases and services will be financed by overdrafts secured on this authority. In effect, therefore, restoration of the estates will be mostly self-financed.

In order to join the company, estate owners must organize themselves into groups, based on units of not less than 100,000 acres, each group having authority to make further divisions into subgroups of not less than 10,000 planted acres. Nevertheless, owners will preserve their individual rights of ownership and their separate identities. For this reason, it has been decided that grouping need not conform strictly to a geographical basis. It is reported that a number of producers have already agreed upon the structure of various groups. Such plans will be left to the owners concerned, and will not be initiated by the R.G.A.

Purchasing to be Centralized

With the approval of the Colonial Office, the new company will form the "representative organization" for Malaya. It will act as the central purchasing body for the supply of stores and equipment, and will also centralize the supply of staff and labor. In turn, the British Government will act as the sole buyer for export, and has already established a rubber-buying unit composed of men with wide experience in the trade. The central organization will report upon the condition of estates and submit minimum needs as soon as possible. It has been estimated that 80% of the experienced European pre-war staffs are now prisoners of war, and while the status of native workers is not known, it is supposed that it will be necessary to husband the supply of available hands carefully.

With the new central organization, groups and sub-groups will elect their own committees and make individual arrangements for administration, etc., and the chairmen of the groups will be directors of the Malayan Estate Owners' Co., with the right to appoint an additional director where the planted acreage of a group exceeds 200,000 acres. The Colonial Office will be represented on the board. Each group may appoint Malayan representatives and retain all rights of local management. The company will also establish a local board in Malaya, to which will be delegated an appropriate authority.

Except for small owners (below 100 planted acres), for whom the Government will assume complete responsibility, the Malayan Estate Owners' Co. will possess a virtual monopoly of supplies. Hence, membership is desirable for every individual estate unit. However, care has been taken to insure that owners unable or unwilling to join the new organization will have their rights safeguarded as far as possible. Where such claims are considered valid, the R.G.A. states, the Government will arrange for owners "to get assistance (in all respects) to an extent no greater than, and on terms not more favorable than, the assistance extended to the company."

The objectives of the company are set forth by R.G.A. as follows:

1. To get the rubber estate industry in Malaya started on productive operations as quickly as possible after liberation.

2. To diminish the period of scarcity.

3. During that period to provide for:

a. A fair distribution of goods and services.

b. Their economical use by concentration of productive operations.

c. Compensation to those who surrender their share of goods and services.

The R.G.A. has announced that it will soon supplement this scheme with a similar plan for rehabilitation of the estates in Borneo.

1941 Copies Wanted

A number of copies issued in 1941 are still needed to complete sets of RUBBER AGE desired by various organizations and institutions, particularly in the foreign field. These include the January, March, April, May and June, 1941, issues. A price of 50c each will be paid for each of these back copies returned. Please mail them to the Circulation Manager, RUBBER AGE, 250 West 57th St., New York 19, N. Y.

Goodrich recently received a golden anniversary certificate of membership from the National Association of Manufacturers.

RMA RESUMES ITS REPORTS ON TIRE-TUBE PRODUCTION

The Rubber Manufacturers Association has resumed its monthly reports on production in the United States of pneumatic casings and inner tubes, details of which have been withheld from public consumption since March, 1942, because of security reasons. In resuming these reports, the Association has departed from its pre-war formula to include a breakdown of figures showing production in civilian passenger car, truck and bus casings and in tubes. Production figures in these categories were not shown prior to the war.

The outstanding fact disclosed in the tabulation of tire and tube data was the sharp change in the relationship of inventory to production for the six months ending in June, 1945, as compared with the first six, peacetime months of 1941. Production of passenger car casings for the first six months of 1941 totaled 29,040,711 units, with 5,365,459 units held in inventory. Estimated production for the six months ended last June 30 was 10,020,817 units, with only 950,412 units in inventory.

At the same time the report reflects the vast increase in truck and bus tire production, stepped up by the industry to meet unprecedented military demand. Truck and bus tire production stood at 5,601,982 units for the six months ending June 30, 1941. Production in the first half of 1945 shows an increase of nearly 100 per cent, with output estimated at 10,140,059 units, the association noted. The truck and bus tire inventory stood at 738,236 units for the first half of 1945, nearly a million units under 1941, when it was at 1,722,278 for the same period.

Principal reason for the unusually low inventory position is found in the fact that OPA was compelled to release tires more rapidly than they were being built during the war. Heaviest drain on the stockpile occurred in 1942 and 1943, before synthetic rubber became available in quantity.

The report covers only automotive pneumatic casings. It does not include any solid rubber tires or pneumatic tires for motorcycles, bicycles or for aviation, agricultural or industrial equipment.

Goodrich Introduces P-F Soles

The B. F. Goodrich Co., Akron, has developed a new type of rubber sole for canvas shoes incorporating a principle known as "P-F," or "Posture Foundation." P-F is a special built-in feature which is said to cradle the arch in a way that wards off strain, to keep the bones of the foot in their natural position, guard against flat feet, avoid strained, tired leg muscles, and to provide safe, correct, comfortable foot support. Novel features of the sole are an orthopedically correct wedge for maintaining proper alignment of the bones of the foot and a sponge rubber cushion under the sensitive area of the foot.

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COLLYER DISCUSSES THE PROBLEM OF WORLD SURPLUS

John L. Collyer, president of the B. F. Goodrich Co., Akron, and former Special Rubber Director, told an audience of the Chautauqua Institution, at Chautauqua, N. Y., on August 20, that the next rubber problem will be that of a world surplus of rubber. With our own huge synthetic rubber capacity, a small foreign synthetic capacity, and a tremendous world production of natural rubber, he declared, we could have 2,800,000 tons to supply the expected 1,500,000-ton annual demand.

Once natural rubber production has been restored, America will have to choose between the natural and synthetic materials, a decision that involves important economic and political problems, he said, adding that synthetic rubber can make major contributions in limiting the extent to which prices for natural rubber increase.

Today, however, synthetic rubber costs and prices are complicated by a problem of base material costs. Approximately half our present total synthetic rubber capacity is based on alcoholic butadiene and the balance on petroleum butadiene. The cost of synthetic rubber from grain alcohol is above 40c a pound, while that produced from petroleum is about 14c a pound, exclusive of amortization and depreciation costs.

As long as our total needs for synthetic rubber are substantially above 500,000 tons annually, continued use of grain alcohol may keep the average cost of synthetic rubber as high as 30c a pound compared with a pre-war condition in which natural rubber could be laid down in New York and sold at a fair margin of profit at 12c a pound, Mr. Collyer said. When rubber needs fall below 500,000 tons a year, our total synthetic requirements can be based on petroleum butadiene, and synthetic rubber can then exercise its maximum restraining influence on natural rubber prices. Commenting on the competition between synthetic and natural rubbers, Mr. Collyer stated that discoveries may be made which will whittle down, or possibly even eliminate, the quality advantage which natural rubber now holds for tires.

In his talk, Mr. Collyer also predicted that American motorists should be able to buy tires on an unrationed basis by December, in spite of the problems incident to switching the rubber industry from wartime production to high level civilian tire manufacture. The tire industry, he said, now has the immediate assignment of putting good tires on the wheels of America's 30,000,000 passenger cars, trucks and buses.

Pre-war capacity was 65,000,000 tires a year, but the industry is now capable of producing more than 110,000,000 civilian tires annually, which will contribute importantly to a new high level of world rubber consumption that may reach 1,500,000 tons a year, the Goodrich executive stated.

Comparison of Fuel Cells

A comparison of airplane self-sealing fuel cells of American and Japanese make is shown in the accompanying illustration. The one on the left is a

product of the B. F. Goodrich Co., Akron, while the one on the right is of Japanese make. According to Goodrich engineers, the superiority of the American fuel cell is indisputable. The Jap construction offers little protection against gunfire, since it is only a multiply protective covering bonded to a metal tank which "blossoms" when hit and prevents the rubber from doing its sealing job. The Jap cell was recovered from a blasted bomber.

Aliphatic Sulfur Chemicals

The Chemical Products Department of the Phillips Petroleum Co., Bartlesville, Oklahoma, has announced the production of a new series of aliphatic sulfur chemicals—mercaptans and dialkyl disulfides—three of which are already available in tank car quantities. These new materials are relatively narrow boiling mixtures of isomers, mercaptan purity in some instances running as high as 99 per cent. The sulfur-carbon linkages are predominantly tertiary. Most of the compounds show some decomposition at temperatures above 300° F. The new materials are expected to find several applications in rubber, not only as additives to rubber compounds, but as polymerization modifiers in synthetic rubber and other elastomers, and as solvents.

Plan New Rosin Facilities

Newport Industries, Inc., Pensacola, Florida, has announced that it has let contracts for the engineering and construction of a new rosin plant at Oakdale, Louisiana, at an estimated cost of $2,500,000. The first unit to be provided will have a capacity equivalent to a daily output of 175,000 pounds of rosin, 3,700 gallons of turpentine, and 2,200 gallons of pine oil. A second unit will supply manufacturing facilities for the production of terpene chemicals and diversified products.

ARMY ORDNANCE PIONEERED IN APPLICATION OF SYNTHETICS

Of equal importance with the spectacular growth of the synthetic rubber industry was the less publicized technical effort that was made by scientists and engineers in learning to use the new materials. The Ordnance Department of the U. S. Army, the largest of all users of rubber, has now made public the leading part which it took in this development. Ordnance early recognized that the Army faced a complete breakdown in its ability to move if synthetic rubber did not stand up in combat, and took several far-sighted steps to insure the highest quality products, according to a special report issued by Major J. J. Robson, Chief, Rubber Branch, Development Division, Office of the Chief of Ordnance, Detroit, Mich.

The first of these was taken immediately after Pearl Harbor, when a production order for 293,500 synthetic test tires was placed with the rubber companies. This was the first large volume order ever effected for synthetic rubber. Tests of these first tires showed that synthetic rubber had several serious adverse characteristics in the cutting and cracking of treads and susceptibility to heat and bruise type failures. To overcome these deficiencies, Ordnance established extensive test programs devoted to the improvement of synthetic rubber. These were located in the rocky hill country of Texas, in the hot California desert, in average conditions in Maryland, and in the severe cold of Manitoba and the Alaska Highway.

An index to these tests is the Ordnance Tire Test Fleet of San Antonio, Texas, devoted exclusively to synthetic development, where more than 12,000 experimental synthetic tires were tested and vehicles ran more than 23,000,000 miles total, more than 900 times around the earth. As a result of these exhaustive tests, by far the most extensive in rubber history, Ordnance was successful in converting U. S. Army truck and armored car tires to 87% synthetic and 13% natural rubber. Another result of Ordnance tests, was the adoption of Butyl rubber exclusively for Army inner tubes.

Still another Ordnance development of interest is the "Combat" tire, the special type employed for armored cars and certain gun carriages which are particularly subject to enemy fire. Battle experience has proved that these tires, which enabled vehicles to run for at least 40 miles after the tires had been deflated, were a decisive factor in preventing casualties and in saving vehicles and the lives of men.

Ordnance tire experts sum up their experience with synthetic rubber in the following statement: "Synthetic rubber has done an excellent job in the small and medium size tires. In the larger sizes, cracking of treads is still a problem. Synthetic rubber is not yet as good as crude for tires, but it has withstood the acid test of combat.

JOHNSON RUBBER COMPANY HAS FIFTIETH ANNIVERSARY

The Johnson Rubber Co., of Middlefield, Ohio, manufacturers of molded and extruded rubber products, which received its start in 1895 in the wooden container business, is currently celebrating its golden anniversary. The history of the company makes interesting reading.

In 1893 a partnership consisting of Howard and Walter Shellito, of New Lime, Ohio, built a plant in Middlefield for the manufacture of staves for wooden pails and tubs. Two years later, Joe E. Johnson, a harvesting machinery salesman, persuaded the brothers to form a new company for the production of finished pails and tubs, instead of shipping their raw stock to Erie, Penna. The company was incorporated under the name Udall-Shellito Co., with Mr. Johnson as president, S. A. Udall, vice-president and secretary, Howard Shellito, treasurer, and Walter Shellito as superintendent.

In 1898 Mr. Udall and the Shellito brothers sold their stock, and the company was reorganized, with Mr. Johnson retaining the presidency. As the company prospered, plans were made for building a branch plant in Elkins, W. Va., and eventually moving the main plant there. In 1905 the firm started buying timber in Elkins, and by the following year it owned 4,000 acres and had formed a branch company known as the Elkins Pail and Lumber Co.

The Middlefield factory was destroyed by fire in 1907, but was rebuilt on the advice of the timber buyer, who estimated that there was enough timber in the vicinity to supply the company for 10 years. The same year Mr. Johnson was elected president of the Elkins branch. In 1917, Smith M. Johnson, now president, joined his father and uncle in the management of the business, as vice-president. Two years later the factory was again destroyed by fire. By 1921 it had been rebuilt, and a department for the manufacture of steel containers had been started.

In 1928 the company installed a small unit of machinery for making its own rubber gaskets, and gradually developed a business in the manufacture of general molded and extruded rubber products. In 1933 Mr. Joe Johnson died. In 1935, owing to the depression and loss of volume in the steel pail business, this business was sold, and plans were made for greatly expanding the rubber business. By the following year, the company had developed large sales to the automotive, refrigerator and washing machine trades. That year the name of the firm was changed to the Johnson Rubber Co.

A large, modern building was constructed in 1939 to house the extruded rubber department, and modern presses were installed to increase the volume of the molded department. In 1941 the molded department reached its peak business volume. Rubber restrictions in 1942 caused the laying-off of 300 employees, but by the next year the company had developed a volume of war business that taxed the capacity of the factory. In 1943 part of the factory was destroyed by fire. A new, modern building was erected, and streamlined production was started in April, 1944.

During 1944 there was no let-up in the demand for war material, and during the summer a new department was set up for putting rubber gaskets on incendiary bombs. Fifteen thousand of these bombs were turned out by the factory per day. In 1945 the company opened a branch plant at Pawling, N. Y., which is known as the Pawling Rubber Co.

Value of Rubber Products

According to a table of increased production expected in twenty leading industries in the United States in the first full post-war year, compared with 1939, as estimated on the basis of a survey conducted by the Committee for Economic Development, the value of rubber products is expected to rise from $902,300,000 in 1939 to $1,329,200,000, an increase of 47.3%. Larger gains are anticipated for only two other non-durable goods industries—tobacco products, which is expected to increase by 69.4%, and chemicals and allied products, 58.2%.

Develop Fabric from Feathers

A new fabric made principally from chicken feathers, which is designed for use in suits, dresses, sweaters and other wearing apparel of the future, has been developed by the U. S. Rubber Co. The new fabric looks like wool but is reported to be warmer, softer, and lighter than wool. Odorless and possessing a brilliant luster, it can be laundered in soap and water with no more shrinking than in cotton, and it can be dyed any color. The feathers are particularly adaptable for admixture with other staple textiles, such as rayon, cotton, wool and nylon. The feather content of the fabric used in the laboratory experiments ranges from 60% to 70%.

Rheestone Names Officers

The Rheestone Thread Corporation, which was organized for the manufacture of rubber thread in December, 1944, and which operates its factory in Warren, R. I., has announced the election of the following officers: *President,* Daniel Rhee; *Vice-President,* Alfred B. Lingley; *Treasurer,* Malcolm E. Stone; *Secretary,* William C. Waring, Jr. The company's factory is now in partial operation in purifying wild natural rubber, but plans full production of rubber thread by the early part of 1946. Approximately 150 to 200 people will be employed.

NAVY ENDS ITS SEIZURE OF GOODYEAR AKRON PLANTS

The five Akron plants of the Goodyear Tire & Rubber Co. were returned to management control by the U. S. Navy on August 30, eight weeks after the government seized the strike-bound facilities and about a week after receipt of the original restoration order. The end of Navy control was held up by a demand of the War Labor Board that the Goodyear local of the United Rubber Workers of America (CIO), which called the strike, promise in writing to submit any future disputes to the Board or to some other government agency.

Before the Navy seizure was terminated at the Goodyear plants, P. W. Litchfield, chairman of the company, issued a statement in which he made a strong bid for postwar harmony in an industry that has long been particularly plagued by labor-management difficulties. He promised that the Goodyear management will go more than half-way to make the relationship between the company and the union "a pleasant and effective one." He assured the company's employees that comparatively minor reconversion problems in the tire and rubber plants are being worked out speedily and that "steady work and steady incomes are certain for some time to come."

Labor difficulties in Akron rubber plants, however, are still rampant. Production at the six Goodrich plants was virtually halted on September 4 when most of the production workers refused to cross picket lines set up by striking foremen. Members of the Foremen's Association of America went on strike on September 3 protesting against alleged wholesale layoffs without regard to seniority or service and also demanding a 6½ hour working day for supervising employees.

In a statement issued by Goodrich, the company indicated that it would continue to deal with foremen as individuals "until such time as an election is ordered by the government and held under government supervision and Local 98, FAA, has been certified as sole bargaining agency."

It is known that the U.R.W.A. is attempting to establish two principles which will have important implications in the postwar reconversion period. The first is that industry should adopt a five day, 30 hour week at no reduction in wartime take-home pay in the interest of full employment, and the second is that foremen in industry are not part of management but should be treated as employees under the National Labor Relations Act. These are national, not local, implications.

Substantial price reductions on its line of Marmix resin-water dispersions have been announced by the Marbon Corp., Gary, Ind. The new prices range from $1.35 to $1.75 per gallon, depending on quantity.

Schatzel Joins Rome Cable

R. A. Schatzel

Rudolph A. Schatzel, formerly director of research of the General Cable Corp., Bayonne, N. J., was recently elected vice-president and director of engineering of the Rome Cable Corp., Rome, N. Y. Mr. Schatzel was born August 14, 1895. He attended Union College, Schenectady, N. Y., and was graduated with B.S. and M.Sc. degrees. After graduation, he joined the General Electric Co. Later he became an instructor at Union College. Then, obtaining a fellowship, he continued his graduate studies at the Massachusetts Institute of Technology. In 1924 he entered the employ of the Rome Wire Co., Rome, N. Y., with which he remained for 18 years. Subsequently he was associated with the General Cable Corp.

During the war, Mr. Schatzel served as chairman of an industry advisory committee of WPB, as representative of WPB on the War Committee for Dielectrics, and as chairman of the Navy Bureau of Shipping Industry Co-ordinating Committee for Shipboard Cables. He has recently returned from a visit to Europe, where, with a group of other scientists, he studied German technological developments. Mr. Schatzel is the author of several articles which have appeared in leading scientific publications and has been granted a number of patents on various types of wires and cables.

Pharis Names Vice-Presidents

Ralph Reel, formerly factory manager of the Pharis Tire & Rubber Co., Newark, Ohio, has been promoted to the newly-created position of vice-president in charge of research and development. He will also act as an advisor and co-ordinator in connection with the operation of the company's subsidiaries. Henry Houlette, a former factory manager of the company, who has recently been serving in the same capacity with the Inland Rubber Corp., Chicago, Ill., has returned to Pharis as vice-president in charge of manufacturing.

New B.R.P.R.A. Publications

The British Rubber Producers' Research Association, 48 Tewin Road, Welwyn Garden City, Herts, England, has issued several additional publications in recent months, including the following: *The Structure of Polyisoprenes. Part IV. Double Bond Interaction in Certain Carbalkoxy-Substituted 1:5 Dienes,* by L. Bateman and G. A. Jeffrey (Publication No. 57); *The Structure of Polyisoprenes. Part V. Ultra-Violet Absorption Spectra of Certain Carbalkoxy-Substituted 1:5 Dienes, and the Charge-Resonance Spectra of Glutaconic Ester Enolate Ions,* by L. Bateman and H. P. Koch (Publication No. 58); *The Behavior of Keten towards Olefins and Olefinic Peroxides* and *Reactivity of Isoprenic and Analogous Hydrocarbons towards Thiocyanic Acid and Dithiocyanogen,* by Ralph F. Naylor (Publication No. 59); *The Interaction between Rubber and Liquids. Part VII. The Heats and Entropies of Dilution of Natural Rubber by Various Liquids,* by J. Ferry, G. Gee, and L. R. G. Treloar (Publication No. 60). Publications Nos. 57, 58 and 59 are reprints from the *Journal of the Chemical Society,* and Publication No. 60 is a reprint from the *Transactions of the Faraday Society.* In addition, the B.R.P.R.A. has also made available a pamphlet on "The Effective Work of Adhesion," a reprint from *Paint Technology.* Copies of these publications may be secured by writing to the Association.

California Group Holds Outing

The third annual summer outing of the Northern California Rubber Group was held at McNear's Beach, Marin County, Calif., on August 12, and was attended by approximately 70 members and guests. A very enjoyable afternoon was provided by the committee in charge. Entertainment consisted of dancing, competitive games such as horseshoe-pitching, throwing darts and guessing contests, as well as swimming and fishing. A prize raffle was also held. Members brought their own lunches, and refreshments, ice and charcoal were furnished. A large number of unusual prizes was distributed to winners of the contests and of the raffle.

Campbell Lauds Cabot Shops

Lt. General L. H. Campbell, Jr., Chief of Ordnance, U. S. Army, recently sent a letter to the Cabot Shops, Inc., Pampa, Texas, a subsidiary of Godfrey L. Cabot, Inc., Boston, Mass., congratulating the firm on its "tremendous accomplishment" in the production of ordnance materials. The record of the company, Gen. Campbell said, is particularly outstanding because it serves as a model of American ingenuity and aggressiveness in tackling problems of manufacturing processes quite foreign to the company's normal operations. Among other products, the Cabot Shops was engaged in the forging of gun tubes.

Heads Rubber Label Sales

Geo. C. Follett

George C. Follett, until recently materials superintendent at the synthetic rubber plant at Institute, W. Va., has been named sales manager of rubber labels of the Naugatuck Chemical Division, United States Rubber Co., according to an announcement by R. E. Casey, general sales manager for the division. Mr. Follett, who was associated with the division from 1913 to 1942, will make his headquarters at Naugatuck, Conn. Since April, 1942, Mr. Follett has been associated with the company's synthetic rubber division, first at Naugatuck, Conn., and later at Institute.

Bibliography on Science

A select bibliography entitled "The Social Impact of Science," which was prepared by the Library of Congress, has been issued by the Subcommittee on War Mobilization of the Senate Military Affairs Committee as an aid in the study of legislation on science now before Congress. The bibliography lists more than 500 titles of books, pamphlets, articles and Congressional bills and reports dealing with the social and economic problems arising from scientific progress. A special section covers the available literature on atomic power, including several volumes still in press. The bibliography is available from the U. S. Government Printing Office, Washington 1, D. C.

Detroit Group Has Meeting

The Detroit Rubber & Plastics Group, Inc., was scheduled to hold a meeting at the Hotel Detroit-Leland, in Detroit, Mich., on September 13. F. S. Conover, development manager, Naugatuck Chemical Division, U.S. Rubber Co., was to deliver a talk on "Synthetic Latex" and a motion picture was to have been shown. Complete details of the meeting will appear in the next issue.

CASTILLA TREE MAY BE BASIS OF WESTERN RUBBER INDUSTRY

The Castilla tree, which is indigenous to Latin America from Mexico to Peru, may contribute to the development of a natural rubber industry in the Western Hemisphere, according to a study by E. M. Blair and T. F. Ford of the Rubber Development Corp., Washington, D. C., which was recently reported in *Industrial and Engineering Chemistry*. Castilla's possibly lower labor costs, resistance to disease, and latex stability are fundamental advantages, according to this study.

One valuable property of Castilla is that it is softer than Hevea. This property suggests many uses for which Hevea is unsuited. Furthermore, the particles of Castilla latex are somewhat larger than Hevea particles and more nearly uniform. Each of these differences might be the basis for developments of special uses for this latex.

Information now available on Castilla suggests that this tree may be developed to meet the needs of Latin American small farmers, who could produce it as a secondary or cash crop, the report states. As an incidental or secondary crop, Castilla has the advantage that neither special cultural operations nor meticulous tapping methods are required. Castilla latex is stable for days or weeks, which would permit small farmers to harvest it and ship it in small lots to central blending and coagulating stations for processing.

Also, high labor costs which prevail in the West favor the tree which gives the most rubber per man-hour, and this tree may be Castilla, according to the report, since there are indications that yields per tree could be greatly increased by selection. The study found that apparently mature, unselected Castilla yields two pounds of dry rubber per tree per year, and results in Panama indicate that better yields might be obtained. The best reported yields per acre for Castilla in this hemisphere are one-third to one-half as much as for the best Hevea in Malaya. Individual variations in yields between Castilla trees are enormous, however, which suggests possible improvements in yield comparable to those which have been obtained in the past several years with Hevea.

While Hevea can be tapped every other day, Castilla can be tapped only three or four times a year at most, and several cuts are made to drain the whole area of the trunk. If on a Castilla plantation, one man could tap 15 mature trees per day, and if each tree gave two pounds of dry rubber per year in those tappings, one man could produce approximately 3,000 pounds of dry Castilla rubber per year, while if each tree gave three pounds, one man could tap 4,500 pounds per year.

At Mariato, Panama, where the trees are growing under jungle rather than plantation conditions, but where tapping is under some supervision, the average rate of latex collection is 5.5 gallons per day per man, or approximately 11 pounds of dry rubber per day, or 3,300 pounds per year. At Mariato the highest rate of collection for the best tapper is approximately 9,000 pounds per year, as compared with the 9,000 or 10,000 pounds on Hevea plantations of selected material or with bud-grafted trees. With plantation facilities and Castilla trees of uniform size, the report concludes, still better results than the present best at Mariato could surely be obtained.

Visit English Tire Plant

The accompanying photograph shows John W. Thomas (left), chairman of the Firestone Tire & Rubber Co., and James E. Trainer, vice-president in charge

of production, as they boarded the Pan American Dixie Clipper on August 12 for a visit to the Firestone plant in Brentford, England. This was their first visit to the British plant since the war. The plant, incidentally, is reported to have completely escaped bomb damage, although an automotive plant directly across the street was destroyed.

Change GR-S Specifications

Effective August 15, all regular GR-S will be manufactured at a lower hydrocarbon conversion, according to an announcement by the Office of Rubber Reserve, Reconstruction Finance Corp., Washington 25, D. C. This change will tend to make GR-S process more easily without changing its other physical and chemical characteristics. The new GR-S will be the same as the former Experimental Polymer X-180-GR-S, according to the report. As of the same date, the GR-S used in GR-S-Black 1 will be produced at a lower conversion. Thus X-238 GR-S will become GR-S-Black 1, and the same tendency toward easier processing should be reflected in this change.

RUBBER FOR CIVILIAN USE IS ASSURED TO ARGENTINA

The United States and Brazil will supply Argentina with enough natural and synthetic rubber to manufacture the number of tires and tubes necessary to meet the minimum requirements of her civilian population, according to a three-sided arrangement reached on May 2, the details of which were revealed in Buenos Aires on August 14. Before the end of the year Argentina is expected to receive enough rubber to produce 150,000 tires and tubes, in addition to 3,000 finished tires and tubes, the delivery of which was guaranteed last May.

According to the original agreement, Argentina was to receive an immediate "token delivery" of 3,000 tires and tubes and 1,000 tons of rubber and a committee of American, Brazilian and Argentine experts was to decide Argentina's requirements. The committee decided that Argentina needed to run a minimum of 50,000 passenger cars and 100,000 trucks and buses all of which use about 300,000 tires annually.

The amount of rubber required to manufacture that number of tires was placed at 700 tons of crude and 4,000 to 5,000 tons of synthetic rubber. It was decided that before the end of the year, Argentina should have access to 2,700 tons of synthetic rubber and 350 tons of crude, besides the token deliveries. The crude rubber included Argentine stocks estimated at 120 tons and the balance of 200 to 250 tons should be supplied by Bolivia, with which Argentina has a separate agreement.

The agreement is, however, subject to several conditions. The Army is specially excluded from its benefits, since all the rubber to be supplied is for "civilian requirements." The large number of civilian trucks taken over by the Army will have to be returned to their normal uses before rubber is delivered. The deliveries will depend on shipping facilities and on the Argentine Government's suppression of the traffic in smuggled rubber and tires across the Brazilian and Bolivian frontiers.

The agreement was made public, according to report, because the Argentine Government hoped that it would help to discourage the smuggling, which created a rubber shortage in Bolivia and some parts of Brazil. It is calculated that 30,000 tires have been smuggled into Argentina during the past six months.

Booklet on Circosol-2XH

A technical booklet outlining the properties and applications of Circosol-2XH is currently being offered by the Sun Oil Co., Dept. 1, Philadelphia 3, Penna. Circosol-2XH, a petroleum derivative, has been used in the manufacture of tires, footwear, sheeting, mechanical goods, and other products made with GR-S. In tires, use of the softener is reported to produce higher resilience and lower heat build-up under easy processing conditions.

NAMES IN THE NEWS

H. B. "HAP" MORRIS, until recently associated with Latex and Lotol Division of Naugatuck Chemical, has joined the staff of the Killian Manufacturing Co., Akron, as technical director.

P. S. VORMELKER, formerly superintendent of the Dunne Rubber Co., Ashtabula, Ohio, has joined the Hershberg Products Co., Inc., also of Ashtabula, as vice-president in charge of chemical engineering.

SIDNEY D. KIRKPATRICK, editor of *Chemical & Metallurgical Engineering*, will receive the Chemical Industry Medal for 1945. The medal is awarded annually by the American Section of the Society of Chemical Industry.

GASTON F. DUBOIS, vice-president and a member of the executive committee of the Monsanto Chemical Co., St. Louis, Mo., and holder of the Perkin Medal, has retired from active business. He will continue as a director and will also serve the company as a consultant.

E. D. WACKER, associated with the C. J. Tagliabue Mfg. Co., Brooklyn, N. Y., for some 22 years, has been named general manager of the company, which is now a division of the Portable Products Corp.

DR. PAUL J. FLORY, research chemist, Goodyear Tire & Rubber Co., Akron, has been awarded the Sullivant Medal by Ohio State University. The award is made once every five years "for an admittedly notable achievement on the part of a son or daughter of the university" in any line of endeavor.

DR. BERNARD S. FRIEDMAN, until recently associated with the Universal Oil Products Co., has been appointed director of research and development for the Reyam Plastic Products Co., Chicago, Ill.

W. J. FRISBY, who has been with the Polson Rubber Co., Garrettsville, Ohio, for the past two years, and who was previously associated with the B. F. Goodrich Co., Akron, for 20 years, has been elected a vice-president and member of the board of the Polson company.

MAURICE C. TAYLOR, manager of research at the Niagara Falls, N. Y., laboratories of the Mathieson Alkali Works, has been appointed resident director of research and development. J. DOUGLAS MACMAHON, previously assistant manager of the sales development department, has been named assistant to the technical director.

JAMES S. WILSON, head of the plastics molding laboratory of the Watson-Stillman Co., Roselle, N. J., and previously associated with the plastics division of General Electrics, has been advanced to the position of manager of plastics equipment sales.

LEO W. RAINARD, who has been in charge of the research laboratory of General Latex & Chemical Corp., Cambridge, Mass., since 1943, has joined the staff of the Institute of Textile Technology, Charlottesville, Va., where he will work on high polymers.

TED E. ALLEN, formerly secretary of the contest board and manager of the car service department of the American Automobile Association, of which he has been an executive for 17 years, has joined the Brake Lining Manufacturers Association, New York City, as commissioner.

CARL E. CUMMINGS, associated with the Texas Company since 1923, and who has been serving as deputy chief petroleum supply officer for the European Theatre of Operations with the rank of colonel, has been named to succeed the late ALLEN V. RITCHIE as superintendent of the company's research laboratory at Beacon, N. Y.

ARNOLD H. SMITH, assistant director of the foreign department of the Monsanto Chemical Co., and formerly associated with the company's Rubber Service Laboratories, has been named director of the foreign department. He will continue to make his headquarters in St. Louis, Mo.

WILLIAM S. WOODWARD has been appointed eastern district manager of the American Zinc Sales Co., Columbus, Ohio, succeeding JOHN SELLON, who has joined C. K. Williams & Co., Easton, Penna., as sales manager.

HAL P. HEADLEY, who has served the B. F. Goodrich Co., Akron, for nine years as a chemical engineer, has been appointed technical consultant for the Trelleborg Gummifabriks Aktiebolag, Trelleborg, Sweden, for a period of three years.

JOHN J. B. FULENWIDER, assistant general manager of the cellulose products department of the Hercules Powder Co., Wilmington, Del., who has been with the company for 19 years, serving previously as resident engineer and assistant superintendent of the firm's Parlin, N. J., plant, has been appointed general manager of the department.

Named Miami Factory Manager

Walter E. Head

Walter E. Head, formerly factory manager of the B. F. Goodrich Co. plant in Los Angeles, Calif., has been named factory manager of the company's new tire plant in Miami, Oklahoma. Mr. Head joined Goodrich as a tire builder in 1924, later becoming industrial engineer and manager of the industrial engineering department in the Akron plant of the tire division. He was transferred to California in 1939 as production superintendent of the Los Angeles plant and named factory manager in 1942. The Miami plant began the production of tires early this year and will reach full production capacity shortly.

LOUIS J. CHATTEN, who recently resigned as director of the WPB Radio and Radar Division in Washington, D. C., has been appointed vice-president and general commercial manager of the North American Philips Co., Inc., New York City.

CHARLES TENNYSON, secretary of the Dunlop Rubber Co., Ltd., of England, was recently knighted by the King in recognition of his work as Chairman of the Central Institute of Art and Design and the National Register of Industrial Art Designers.

H. E. HEILMAN, manager of the Akron tire district of the B. F. Goodrich Co., Akron, who joined the company in 1926 and from 1931 to 1938 served in the firm's International Division, has been named operations manager of the International Division.

MAHLON G. MILLIKEN, general manager of the cellulose products department of the Hercules Powder Co., Wilmington, Del., since 1934, has been elected a vice-president of the company.

FINANCIAL NEWS

NET PROFIT OF $7,509,868 REPORTED BY GOODYEAR CO.

The consolidated balance sheet of the Goodyear Tire & Rubber Co. and its subsidiaries for the first six months of 1945 shows a net profit of $7,509,868, after charges, taxes and provision for renegotiation of war contracts. This profit compares with $7,491,078 for the comparable period of 1944. In both periods the net income was equal, after preferred dividend requirements, to $2.90 a share on 2,053,677 common shares outstanding. Net sales of $407,991,835 compare with sales of $390,422,104 for the first six months of 1944.

Total current assets, as of June 30, 1945, amount to $165,878,432, including $23,316,676 in cash, $49,908,736 in accounts and notes receivable (less reserves of $5,843,076 for bad debts), $997,175 in termination accounts receivable, and $91,655,845 in inventories. Total current liabilities amounted to $33,787,293, including $17,439,607 in accounts payable, $69,734 in termination accounts payable, $818,858 in foreign bank overdrafts, $9,403,485 provided for United States taxes and renegotiation of war contracts (less U. S. Treasury tax notes of $84,946,053), $5,987,883 provided for foreign taxes (less British Government tax reserve certificates of $201,250), and $67,726 in accrued dividends and interest. The ratio of current assets to liabilities is approximately 5 to 1.

In a letter accompanying the report to its stockholders, the company pointed out that sales shown include company expenditures and fees under cost-plus-fixed-fee contracts, but do not include the substantial volume of production in three synthetic rubber plants owned by the government and operated by the company. It is also pointed out that regular dividends have been maintained on the $5 convertible preferred stock and quarterly dividends of 50c per share were paid on the common.

While the company's main effort has been the production of equipment for the Armed Services since V-E Day, the letter stated, increasing production of items for necessary civilian use has been possible. The letter also revealed that 26,917 Goodyear employees had entered the Armed Forces up to August 13.

GOODRICH COMPANY REPORTS NET INCOME OF $5,621,544

The B. F. Goodrich Co. has reported a consolidated net income of $5,621,544 for the six months ended June 30, after all charges, including provision of $32,099,000 for estimated Federal and foreign income and excess profit taxes, and for estimated effect of renegotiation of war contract prices, and after setting aside a reserve of $1,500,000 for contingencies. This amount is equal to $3.52 a common share on 1,303,255 shares outstanding after preferred dividend requirements, and compares with $5,244,308, equal to $3.23 a share, reported for the first half of 1944, when $32,729,000 were set aside for taxes and renegotiation and $2,000,000 for contingencies.

Net sales, excluding the value of the output of government-owned plants operated by the company, amounted to $222,530,675 and showed an increase of 7.88% over the $206,273,349 reported for the corresponding period of the previous year. The net income for the first half of 1945 was 2.52% of the net sales, as compared with the 2.54% in the first half of 1944.

According to the financial statement issued by the board of directors, the company's current assets, as of June 30, 1945, were $120,970,476, including $12,850,187 in cash, $3,381,553 in U. S. Treasury savings notes, $315,315 in marketable securities, $46,418,860 in trade accounts and notes receivable (less reserves for doubtful accounts, discounts and allowances of $2,595,799), $816,132 in other accounts and notes receivable, $1,687,262 in post-war refund of Federal excess profits tax, and $55,501,167 in inventories.

These assets compare with total current liabilities of $27,772,928, including $650,119 in bank loans, $23,614,402 in accounts payable, $3,193,092 in accrued liabilities, and $315,315 in provision for Federal and foreign income and excess profits taxes and renegotiation of war contract prices. These figures represent a ratio of 4.36 to 1. According to the statement issued to stockholders, renegotiation of war contract prices for the year 1944 has been completed, and provision in the accounts for that was sufficient to absorb its effect.

United Carbon Company

First Six Months: Net profit of $922,812, which is equal to $2.32 a share, and which compares with $984,595, or $2.47 a share for the first six months of 1944.

Baldwin Rubber Company

Fiscal Year Ended June 30: Net profit of $493,868, which is equal to $1.57 a share, against $379,492, or $1.20 a share, for the fiscal year ended June 30, 1944.

Garlock Packing Company

First Six Months: Net income of $463,424, or $2.21 a share, against $399,583, or $1.91 a share, for the first six months of 1944.

General Cable Corporation

First Six Months: Net income of $1,378,601, after provision of $6,950,000 for Federal income taxes, which compares with $1,125,058 for the first six months of 1944, when $5,620,000 was provided for taxes. The net income shown is exclusive of a net profit of $281,000 after Federal income taxes derived from the sale of 246,194 common shares of Revere Copper and Brass, Inc., credited directly to earned surplus. All Series C bonds were called for redemption on July 16, leaving the corporation without bonded debt.

Thermoid Company

First Six Months: Net profit of $501,048, after deductions of $511,000 for taxes and $150,000 for contingency reserve, which is equal to 74c a common share, and which compares with $324,073, or 47c a share, for the corresponding period of 1944, when $100,000 was provided for contingencies and $312,000 for taxes. Sales amounted to $13,809,394. Figures for 1945 cover operations of the new subsidiary, Thermoid of California, Inc.

Columbian Carbon Company

First Six Months: Consolidated net earnings of $1,671,362, after provision for taxes and renegotiation, which is equal to $3.11 a share, and which compares with $1,667,870, or $3.10 a share, for the corresponding period of 1944. Sales of $13,311,884 compare with $11,491,362 for the first six months of last year.

New Jersey Zinc Company

First Six Months: Net profit of $2,674,957, which is equal to $1.36 a share, and which compares with $2,705,897, or $1.38 a share, for the first six months of last year. Second Quarter: Net profit of $1,317,515, or 67c a share, against $1,350,968, or 69c a share, for the second quarter of 1944.

Intercontinental Rubber Co.

First Six Months: Net income of $372,481, after charges and taxes, which is equal to 62c a share on 595,832 capital shares outstanding, and which compares with $315,765, or 53c a share, for the corresponding period of 1944.

Rome Cable Corporation

Second Quarter: Net profit of $122,102, which is equal to 64c a share, and which compares with $125,970, or 66c a share, for the comparable period of 1944.

O'Sullivan Rubber Company

First Six Months: Net income of $238,371, which compares with $170,445 for the first six months of 1944.

LOS ANGELES NEWS

Reconversion of southern California's rubber industry, second only to Akron's, still is in low gear and cannot reach its immediate goal, a further 250% expansion, until more manpower is put on the newly converted production lines.

A War Production Board survey has revealed that 13,000 passenger tires a day are rolling out of Los Angeles factories, as against a low of 3,500 last spring, when the industry's whole effort was concentrated on equipping General Eisenhower's victorious armies. Blocking the way to the goal of 31,000 set by local plants is need for more men to operate the war-expanded facilities, according to Louis M. Dreves, WPB chief for southern California.

Immediate jobs for 1125 workers were indicated by the survey. In the U. S. Rubber plant alone, 850 are needed to operate civilian tire and tube machinery, in addition to the workers who manned the plant during the war period. Firestone officials said 200 men, skilled and unskilled, are needed as tire builders, curing room men, mechanics, and as trainees for various other jobs. At the Goodrich plant, it was declared that 75 more men "would get us up to full capacity." Goodyear also will need additional help as soon as more machinery can be installed.

All plants reported experiencing heavy losses of personnel since V-J Day. P. R. Levering, Goodrich personnel manager, said many people left to return to their eastern homes, and opening of schools also deprived the plant of any student employees. C. L. Smith, factory manager for Firestone, cited the same difficulties in trying to maintain the round-the-clock operation necessary for efficient production in the rubber industry. He added that many patriotic women employees have quit, feeling that their war job was done. Meanwhile, new pressure from a tire-hungry public reportedly was reaching the industry.

New post-war products already are beginning to blossom, following revocation of most WPB restrictions on civilian rubber goods. The Goodyear plant expects within several weeks to resume production of safety inner tubes, banned during the war. Firestone is developing a new mechanical molded goods division to tap Western markets for which the company had not previously produced here. Items ranging from automobile foot pedal pads and floor mats to plungers and packing for oil well pumps will be molded, and Firestone officials reported active demand for rubber tubing from reconverting plants who need it in products ranging from bicycle pumps, to hose for launches and yachts. Toy manufacturers are seeking tires for scooters and coasters, while other plants have inquired regarding rubber tires for lawn mowers.

U. S. Rubber Company expects new jobs to open up as a result of a war-discovered use for synthetic rubber in covering propeller driveshafts in ships. Plant manager John Miller said every new Navy ship now is thus protected against corrosion and pitting from salt water, and benefits by a greater cruising range. Southland tuna boat builders already have adopted this feature, and the rubber executive sees the West Coast shipbuilding industry as a new post-war market.

The B. E. Dougherty Company will have complete charge of the first autumn dinner meeting of the Los Angeles Rubber Group, Inc., when it meets at its usual place, the Rainbow Room in the Mayfair Hotel, on Tuesday evening, October 2.

The speaker of the evening will be Owen J. Brown, Jr., general sales manager for Godfrey L. Cabot, Inc. The address will deal with the subject, "The Impact of the War on Carbon Black." Mr. Brown is said to be a good public speaker and the members of the Group are looking forward to hearing him on this subject.

All prizes will be donated by the Dougherty company. An entertainment feature will be provided also in addition to the address of the evening.

R. E. Hutchinson, chairman of the Group, will preside and will introduce Mr. Dougherty, who will act as master of ceremonies for the program of the evening.

This will be the first meeting since the final spring meeting on May 22. A record crowd is expected.

The California Rubber Products Company has taken on the new name of California Rubber Products, Inc., and has moved from the old location at 5227 Avalon Boulevard, Los Angeles, to 130 N. Hawthorne Boulevard, Hawthorne. Incorporation was completed recently. A number of well known southern California rubber men are interested in the firm, which is manufacturing a line of mechanical rubber goods as well as sponge rubber. Connected with the firm now are Bill Shawger, formerly with Arrowhead Rubber Company, who is plant superintendent; Bob Miller, formerly with the Miller Gasket Company, who is vice president; and Fred Humphreys, formerly with the General Specialties Company, who is president.

R. M. Howlett of the Bayway Laboratories (Stanco Distributors, Inc.) has been in the Los Angeles territory recently aiding Perbunan users with technical service and advice.

Bill Snyder, who succeeded Vic Vodra as the Pacific Coast representative for the R. T. Vanderbilt Company, recently made

Some scenes at the recent two-day "Fiesta" held by the Los Angeles Rubber Group. TOP: R. E. Hutchinson, group chairman, displaying his prowess as an archer. LEFT: Gilbert Dohm, MacNeal Pierce and Deke Maddy, left to right, checking in at "Rancho de Uplifters." RIGHT: The Outing Committee beams for the camera, left to right, R. E. Hutchinson, C. R. Wolter, E. L. Royal and C. M. Reinke.

a visit to the home plant and to New York City.

George Petelin, formerly of the Goodyear Rubber Company in San Francisco, has resigned his position to join the Griffith Rubber Mills Company in Portland. He is connected with the chemical department.

The Sierra Rubber Company has a new plant under construction into which it will move its activities later. Full details will be given in a later issue.

E. D. Caram, of the Caram Manufacturing Company, is away on a long business and pleasure trip. He expects to have an important announcement to make in a coming issue of this publication.

B. E. Dougherty, of the B. E. Dougherty Company, made an extended business trip through the Pacific Northwest during the last month. He reports business good.

Ed Royal, of H. M. Royal, Inc., is spending considerable time in his beach home during the warm summer months.

T. Kirk Hill, of the Kirkhill Rubber Company, was the prime actor in presenting a $4,000 check drawn by the Squires Club to the Salvation Army for its Will Rogers Memorial Camp at Mountain Crags. Mr. Hill heads the Charities Committee of the club. The camp season just ended extended over 12 weeks during which time 1,800 boys and girls enjoyed vacations of ten days each under ideal outdoor conditions. The work, it is hoped, will be considerably extended next year. Mr. Hill has always taken a primary interest in work of this nature.

Asks Army Release Chemists

National Starch Products, Inc., New York City, is currently circulating the text of a telegram recently sent by its president to the Secretaries of War and Navy, asking immediate remedial action by the Government in speeding up the release of chemists and chemical engineers from the armed forces. It appears to be a fact, the telegram states, that thousands of chemists and chemical engineers are in uniform and performing duties which are not connected with their professional abilities and training. Furthermore, during the past five years practically no chemists or chemical engineers have been graduated and made available for industry, while selective action has not been consistent with industry's needs. The "point system," the telegram shows, is totally inadequate to achieve the speedy release of these men because most of them were deferred longer than other men and few of them saw foreign service. In circulating this message, the company is asking other industrialists to cooperate in seeking prompt action by the Government.

Stabilizing Latex

One of the patents vested in the Alien Property Custodian covers the stabilization of rubber latex. In the method (U. S. Pat. 2,367,120), a rubber latex containing 35 to 40% of solids is mixed with sodium hydroxide, forming about 0.1% of the dry rubber content, and an emulsifier or stabilizer, such as soap. The mixture of latex, alkali and soap is heated under pressure for one hour at approximately 135° C., after which a small proportion of the serum is separated from it. The latex thus treated is said to require less ammonia for conservation and to remain clear when stored in iron vessels.

Goodrich Plans Semi-Works Plant

The B. F. Goodrich Chemical Co., Cleveland, Ohio, has let the contract for a new semi-works plant which will be erected at Avon Lake, 15 miles west of Cleveland, at a cost of approximately $600,000. Designed as a versatile small-scale chemical plant which can easily be converted to a variety of processes, the new plant will be used to develop manufacturing routines for new synthetic resins and chemicals. New adaptations of the company's line of Geon polyvinyl chloride resins will be processed at the plant, as the intermediate operation between the pilot plant of the laboratory and full-scale commercial production. The plant will consist of three buildings, a three-story 50 x 120-ft. process building, a one-story 50 x 140-ft. utility building, which will house laboratory, machine shop, and offices, and a boiler house.

Producing Silastic Parts

The Connecticut Hard Rubber Co., New Haven 9, Conn., has announced that it is already in production of gaskets, seals, hose, and other products made from Silastic Rubber, the new silicone rubber recently announced by the Dow Corning Corporation. Extreme heat resistance is the outstanding physical characteristic of the new rubber, which withstands temperatures from —70° F. to +500° F. and still retains its original resilience and flexibility.

Forms Pawling Rubber Division

The Johnson Rubber Co., Middlefield, Ohio, which marked its fiftieth anniversary in August, has recently opened a new plant at Pawling, N. Y., which is known as the Pawling Rubber Division. The plant, which made its first delivery on July 7, was producing 30 caliber ammunition box gaskets, as well as aircraft gaskets. S. Raymond Thornburg is general manager.

New Zealand Tire Plants

The Bureau of Industry, Wellington, New Zealand, has granted licenses to three corporations to create the first tire plants in that country. The licensed firms include the Firestone Tire & Rubber Co. of New Zealand, the Dunlop Rubber Co. of New Zealand, and the Reid-New Zealand Rubber Mills. The B. F. Goodrich Co. is reported to hold a minority interest in the Reid concern and the Goodyear Tire & Rubber Co. is involved in the Dunlop enterprise. The outcome of the plan, which was set in operation before the war, will be the construction of two entirely new plants, and a large extension of Reid's enterprises. Full production is not expected to be reached until early 1947. The three-way split of permission to enter the tire-manufacturing business was granted subject to the Industrial Efficiency Act, which gives the Minister of Industry power to control industrial development of registered industries.

British Form Reclaim Group

The National Reclaim and Allied Rubber Trades' Association was recently organized in England, with headquarters at 25-29 Coleman St., London, E.C. 2, England. John Lewis, managing director of Rubber Improvement, Ltd., who was recently elected to Parliament, is chairman, and R. G. Kirkpatrick is secretary. In connection with the organization of the new association, it was pointed out that before the war the reclaiming of rubber in England had been in the hands of a very few firms situated in one area of the country, but during the war, and at the instigation and with the assistance of the Ministry of Supply, many small firms had entered the reclaiming industry, a number of them making reclaim for their own use. These firms, it was said, were not represented by any existing trade organization and accordingly have banded together to form the new reclaiming group.

Makes Foreign Appointments

The Goodyear Tire & Rubber Co., Akron, recently appointed three of its employees to company posts in England and Argentina. Scott MacDonald will go to the Wolverhampton, England, plant as a division superintendent in charge of preparatory departments; Lowell Bennett has been named chief chemist of the English plant, and Lewis R. Kilpatrick will go to Argentina as chief chemist. A production squadron graduate, Mr. MacDonald has 15 years' service with Goodyear, and has worked for the last three and a half years in technical service. He is a graduate of Boston University. Mr. Bennett came to Goodyear on the squadron in 1934, after graduating in chemical engineering from the University of Alabama. He has served chiefly in development, and since April, 1943, has been manager of synthetic compounding.

Adamson Appoints Ludwig

Carl Ludwig

Carl Ludwig, formerly manager of construction and development of Hydropress, Inc., has been appointed chief engineer of the Adamson United Co., Akron, according to an announcement issued by Andrew Hale, vice-president in charge of engineering and sales. Mr. Ludwig was graduated from the Case School of Applied Science in 1929 and became chief engineer of Hazelett Metals, Inc., where he engineered and designed special mills for continuous casting of metals. Later he became associated with the Western Cartridge Co. as chief rolling mill engineer of the New Haven Winchester Repeating Arms Division. Subsequently he served for four years as manager of construction and development of Hydropress, Inc. Mr. Ludwig has had broad experience in designing machines for metal forming, and he contributed to the design and development of the well-known Loewy Press, which was extensively used during the war for high speed cold extrusion of non-ferrous metals.

Synthetic Textile Course

An evening course in new synthetic textile fibers, yarns and materials, to be given by Herbert R. Mauersberger, textile consultant and technical editor of the *Rayon Textile Monthly*, has been announced by the Extension Division of Columbia University, New York City. The course will consist of 15 lectures and will cover all new man-made fibers, yarns and fabrics, other than rayon—nylon, Vinyon, Aralac, Velon, Saran, glass, soybean fiber, peanut fiber and plastic-coated yarns—whose classification and physical, chemical and microscopical properties and characteristics will be explained fully on the basis of samples, films and exhibits. The course will be given from 7:00 to 8:40 p.m. every Monday evening from October 1 to January 21.

Allison with Rubber Bureau

George L. Allison, of the B. F. Goodrich Co., Akron, was recently appointed assistant director of technical operations in the Rubber Bureau of the War Production Board, succeeding Thomas J. Newton, who has returned to the U. S. Rubber Co. at Detroit, Mich. Mr. Allison, who since 1917 has served Goodrich in the technical field of development and improvement of rubber manufacturing techniques, became a full-time consultant in the Office of the Rubber Director in August, 1943, and worked on conversions to synthetic rubber in tires and tubes. Since October, 1944, he has been a part-time consultant of the Bureau. Mr. Newton left the U. S. Rubber Co. in 1942 to join the Rubber Branch Production Division of the Army Service Forces. In February, 1944, he was transferred to the Office of the Rubber Director. He has served as assistant director of technical operations for the Rubber Bureau since last October.

Johnson Rubber Finishes

Improved rubber finishes have been added to the line featured by S. C. Johnson & Son., Inc., Racine, Wisconsin. These finishes are said to help retard oxidation and sun-checking, and rubber products protected by them are reported to resist dirt, fingerprints, scuffs and scratches when being packed and shipped and while on display. The new finishes, which can be applied by spraying, dipping or wiping, also act as dry lubricants for rubber parts, eliminating squeaks. The finishes are non-flammable and drying time is short, generally 15 to 20 minutes, less if heat is used. They are also reported to be resilient to a high degree and will resist cracking and scaling under ordinary conditions.

Hewitt Acquires Robins Conveyors

Hewitt Rubber Corp., Buffalo, N. Y., has acquired 90% of the stock of Robins Conveyors, Inc., Passaic, N. J., with which it has been closely associated for the past five years. This combination is said to establish Hewitt as the only manufacturer able to engineer and build all parts of belt conveying systems under a single management and responsibility. Currently, the two companies are furnishing lengthy conveyors in this country and abroad, particularly to Russia and South America, and are reported to have jointly built and installed throughout the world more "long line" conveyor belts than any other manufacturer.

Resyn Adhesive Q-3605, a solvent-free emulsion which is said to give a firm bond between synthetic rubber tires and labels and provide a waterproof, non-smearing and transparent coating for such labels, has been developed by the National Adhesives Division of National Starch Products, Inc., 270 Madison Ave., New York 16, N. Y.

Polymer Corp. Advances Holmes

J. W. Holmes

J. W. Holmes, Jr., associated with the Polymer Corporation, Ltd., since 1942, has been named manager of that organization's newly-created Sales and Technical Service Division, with headquarters at Sarnia, Ontario. Mr. Holmes is also the current chairman of the Ontario Rubber Section of the Chemical Institute of Canada. The new division will handle GR-S and GR-I and other chemical products manufactured by the Polymer Corp., as well as the importation and sale of natural rubber for Canada.

Mr. Holmes attended McGill University. After being graduated he joined Canadian Industries, Ltd., and for several years handled technical sales of rubber chemicals, neoprene and carbon black in the Quebec and Ontario areas. He joined the Polymer Corp. in 1942 as executive assistant to Managing Director J. R. Nicholson and shortly after assumed additional duties as executive assistant to President R. C. Berkinshaw.

During 1943, Mr. Holmes worked for several months on the compounding and processing of Butyl rubber at the Esso Laboratories of the Standard Oil Development Co., at Elizabeth, N. J., and visited rubber factories throughout the United States. Upon his return to Canada he was placed in charge of technical service on Butyl rubber for the Polymer Corp., and in January, 1945, was made assistant technical service manager, holding that position until his new appointment.

New Plant for Phelps Dodge

Ground has been broken on a thirty-one acre site at Fort Wayne, Indiana, for a new $4,500,000 rod, wire and cable plant for the Phelps Dodge Copper Products Corporation. When completed and in full production the plant is expected to employ several thousand.

OBITUARIES

Thomas W. Miller

Thomas W. Miller, founder and for many years president and chairman of the board of the Faultless Rubber Co., Ashland, Ohio, died of a heart attack at his home in Ashland on August 28. He was 70 years of age. Mr. Miller was born in Summit County, Ohio, on February 12, 1875, the son of a blacksmith and carriage builder. He attended the public schools of Manchester, Ohio, and a boarding school at Uniontown, Ohio. At 16 he became a teacher in the district schools, but the following year he attended business college in Akron. Later, he secured a position wtih the Akron Silver Plate Co., and after serving an apprenticeship was sent out as a commercial representative of the firm.

In 1896 he organized the Faultless Manufacturing Co. in Akron, in partnership with several Rochester, N. Y., business men. In 1900 this company became the Faultless Rubber Co. In 1903 Mr. Miller organized the Camp Rubber Co., in association with H. B. Camp. The following year the two rubber companies were merged and their activities were centered at Ashland. Mr. Miller served as treasurer and general manager of the plant until 1907, when, upon the retirement of Mr. Camp, he became president of the firm. He continued as president until 1927 and served as chairman of the board until 1941.

Mr. Miller was a member of the board of directors of the Rubber Manufacturers Association for several years, and, during the war served on several of its committees. Active in civic affairs, he was well-known as a philanthropist. He was a member of the Al Koran Shrine in Cleveland, Ohio, and of the Ashland Shrine Club, as well as other clubs in New York and St. Petersburg, Fla. He is survived by a widow, two sons, and a daughter. Services were held at the family residence on August 31, and burial was in Ashland Cemetery.

Owen E. Lowe

Owen Earl Lowe, assistant to E. L. Hanna, chief chemist of the Davol Rubber Co., Providence, R. I., and former president of the Rhode Island Rubber Club, died suddenly on July 21 from coronary thrombosis at the age of 40. He had been associated with Davol Rubber since 1927. Born in Novia Scotia on February 10, 1905, Mr. Lowe became an American citizen in 1933. He attended public schools in Brockton, Mass., and received a B.S. in chemical engineering from the Rhode Island State College in 1927, joining Davol Rubber immediately after being graduated. Mr. Lowe was a member of several organizations, including the American Chemical Society and both the Rhode Island and Boston rubber groups. He was also a member of the Lambda Chi Alpha fraternity and Phi Kappa Phi, the honorary society. Funeral services were held on July 24 in Cranston, with interment in North Kington, R. I. A widow, two daughters and a son survive.

Eberhard L. Faber

Eberhard Lothar Faber, vice-president and a director of the Eberhard Faber Pencil Co., Brooklyn, N. Y., was drowned in the surf in front of his summer home at Mantoloking, N. J., on August 28, while attempting to rescue his eight-year-old son. He was 51 years of age. Mr. Faber, who was born in 1892 at Port Richmond, S. I., N. Y., was a son of the late Lothar W. Faber, former president of the pencil company, and a grandson of the founder of the firm. He was a nephew of Eberhard Faber, present chairman of the board and president of the company. Mr. Faber was graduated from Princeton University in 1915. He is survived by a widow, a daughter, and his son, who was finally rescued by neighbors. The family home is at 1170 Fifth Ave., New York City.

John P. Sheehan

John P. Sheehan, for many years sales manager for bicycle tires and tubes of the former Fisk Rubber Co. and more recently sales representative for New England of the Fisk Division of the U. S. Rubber Co., died suddenly at his home in Chicopee Falls, Mass., on August 27, following a heart attack. A native of Springfield, Mass., Mr. Sheehan had lived in Chicopee Falls for the past 28 years. A former member of the Chicopee school board, he was a past president of the Holy Cross College Alumni Association, having graduated from Holy Cross College in 1910. He was also an active member of Elder Council, Knights of Columbus. A widow, a son, and two daughters survive.

Orlando F. Weber

Orlando F. Weber, a founder and former president of the Allied Chemical and Dye Corp., died in his apartment at the Waldorf-Astoria Hotel, New York City, on September 6, after a brief illness. He was 66 years of age. Mr. Weber was born in Fredonia County, Wis. In 1920 he helped to found the Allied Chemical and Dye Corp., and served as president of the company until 1934, as well as chairman of the board from 1931 to 1935. He is survived by a widow, a son and a daughter.

Richard B. Earle

Richard Blair Earle, scientific research expert and a pioneer in the development of synthetic rubber, died in Cambridge, Mass., on August 13. He was 69 years of age. Mr. Earle was born in Worcester, Mass., and attended the Worcester Polytechnic Institute, from which he was graduated in 1897. In 1899 he received a master of science degree from Harvard University, and in 1902 a degree of doctor of science from the same institution. At various times he served as an instructor in organic chemistry at the University of Chicago and in chemistry at the Massachusetts Institute of Technology. Subsequently, he became affiliated with the Hood Rubber Co., Watertown, Mass., and spent three years in rubber research at Singapore for the company. He was a member of the American Chemical Society, the Association of Textile Chemists and Colorists, and of the Chemists Club of Harvard. Mr. Earle is survived by a widow, a daughter, and a son.

Plans Howe Memorial Lectures

The Rochester, N. Y., section of the American Chemical Society has announced the inauguration, during the coming year, of an annual lecture as a memorial to the late Dr. Harrison E. Howe, who was active in founding the Rochester section. Dr. Howe began his career in Rochester, where he was employed by the Bausch & Lomb Optical Co. from 1904 to 1916. From 1921 until his death in 1924, he was editor of *Industrial and Engineering Chemistry*. In planning for the lectures, provision has been made for some variation in the form. Instead of a single lecture, a series of two or three lectures on consecutive days may be held, and a symposium on a timely topic will be permitted as an alternative to the annual lecture.

Goodyear Opens New Exhibit

An exhibit depicting world-wide activities of the Goodyear Tire & Rubber Co. has been opened on the fourth floor of Goodyear Hall in Akron, Ohio. Called "The Story of Rubber," it shows a number of Goodyear wartime activities, as well as the product manufacturing in which the company has been engaged for 47 years. The kitchen of the house in which Charles Goodyear discovered vulcanization in 1839 is faithfully reproduced in the exhibit. Plantation scenes are also depicted.

Pittsburgh Corning Corp., Pittsburgh, Penna., has announced that several improvements have recently been made in Foamglas, its new fire-proof, water-proof and vermin-proof inorganic cellular insulation. One improvement is said to increase the number of cells per cubic foot from 5,000,000 to 10,000,000, thus providing additional thermal protection.

CANADIAN NEWS

No serious slackening of industrial output in Canada as a direct aftermath of the victory over Japan is seen by leading industrialists in Kitchener, Ontario, although there will be unpredictable lapses or delays resulting from the change-over to domestic and export production. For the most part, according to a consensus of opinion, the outlook indicates steady and stable conditions, particularly from the viewpoint of employment.

According to A. W. Hopton, vice-president of the Dominion Rubber Co., and manager of that company's Kitchener tire plant, increased civilian demand will offset cancellation of war orders. George W. Sawin, president of Canadian Goodrich, foresees some cancellation of war orders, but points out that it will be necessary to continue to supply rubber products for maintenance of employment in other industries, such as the automotive plants. Troops will continue to need protective rubber clothing, including footwear, and military tires will be needed in volume for some time to come. Irvin K. Weber, factory manager of the Kaufman Rubber Co., stated that there will be no slackening of production at the Kaufman plant, so long as materials are freely available.

Regarding the employment situation, A. G. Partridge, president of Canadian Goodyear, which maintains headquarters in Toronto, recently stated that "no employment cutbacks are expected in the rubber industry as a result of the termination of the Pacific war." Goodyear officials predict full capacity operations for the next four or five years as a result of the backlog of civilian orders which have piled up during the war.

All restrictions on the use of balata and gutta-percha, in force since 1942, have been lifted. In announcing the end of such restrictions, Hon. C. D. Howe, Minister of Munitions and Supply, indicated that it is now possible for manufacturers to resume the production of golf balls. No indication was given, however, as to how long it might take before the first golf balls reached the retail market, but actual over-the-counter sales are not anticipated for at least two months.

All officers and directors of the Crown-controller Polymer Corporation, Ltd., were re-elected at the annual meeting of the corporation held in Sarnia, Ontario, on August 10. These are: *President:* D. W. Ambridge; *Vice-President,* G. A. LaBine; *Secretary,* W. J. Dyke; *Treasurer,* J. R. Nicholson; *Controller,* G. C. Weir. Mr. Nicholson was also re-named managing director. During the meeting it was announced that the Butyl plant at Sarnia was the first of the three such plants on this continent to reach designed capacity. A reduction in the cost of producing synthetic rubber at Sarnia was also reported.

Investigation of German synthetic rubber plants indicates that although they have been in operation for the last ten years, their general efficiency has been more than equalled by the war-created plants in Canada and the United States, E. R. Rowzee, director of research for the Polymer Corporation, Ltd., recently stated in an address to employees at the Polymer plants in Sarnia, Ontario. Mr. Rowzee was one of a group of rubber technologists sent to Germany to determine over-all conditions in the rubber industry of that country. Referring briefly to conditions in postwar Germany, he said that "the general impression carried away from Europe was that most of Germany's large and important industrial cities were so badly damaged that years would be required to rebuild them" and that "many of Germany's key industries were so badly wrecked that at best it would require months to put most of the plants back in operation."

Dunlop Tire & Rubber Goods, Ltd., has awarded a general contract for the construction of a $400,000 addition to its Toronto plant to the Foundation Company, of Ontario. The new addition will be three stories in height and will extend 180 feet west of the present building. It will be of reinforced concrete structure, similar to the present one. The new addition is expected to be completed early next year and is expected to give employment to some 100 additional workers.

Corset manufacturers are beginning to get delivery of synthetic-type elastic fabrics, according to an announcement from the Bruck Silk Mills of Montreal. In making the announcement, the company warned that production of such fabric is still governed by the amount of neoprene yarn available, with present supply only about 10% of normal, but expressed the hope that production of such yarn would be pushed up substantially by the end of the current year.

Some details on the anticipated major building program of the Dominion Rubber Co. at Kitchener, Ontario, were revealed by A. W. Hopton, vice-president and general manager, on August 30. The program will cost well over $1,000,000, including new equipment, and calls for a new building, four stories in height. While no indication of the ultimate size of the building was given, it was stated that the addition, when completed, will increase the Kitchener tire plant to one of the largest on the continent.

Canada Wire & Cable Co., Ltd., a subsidiary of Noranda Mines, Ltd., reports a net income of $296,000, equal to $7.24 per share of Class A Stock, for the six months ended June 30, as against $383,000, or $10.17 a share, for the corresponding period of the previous year. The company's plant at Leaside, Ontario, is reported to be undergoing a complete rehabilitation and modernization, involving an expenditure of approximately $1,000,000.

Commenting on the statement by John L. Collyer, president of the B. F. Goodrich Co., Akron, to the effect that American motorists should be able to buy tires on an unrationed basis by the end of the year, a spokesman for the Department of Munitions and Supply declared on August 22 that the list of Canadians eligible for new tires will be broadened as quickly as possible, but made no comment as to the possible early removal of the rationing regulations. A spokesman of Canadian Dunlop, however, predicted that "there will be plenty of tires for civilian needs within six months."

J. A. Porteous, has been appointed general manager of the Export Division of the Dominion Rubber Company, Limited, according to an announcement by Paul C. Jones, president. Mr. Porteous was born in Guelph, Ontario, educated at Peterborough, Ont., and joined the staff of the general laboratories of Dominion Rubber in 1925. He subsequently held responsible positions in the company and latterly was assistant to the general manager of the Mechanical and Sundries Division. He will continue to make his headquarters in Montreal.

Johns-Manville Starts Expansion

The initial step in a $40,000,000 expansion program planned by the Johns-Manville Corporation has begun with the construction near Bound Brook, N. J., of the first of six buildings on a 93-acre plot to provide "the largest research facilities in the world devoted to building materials and industrial products development." The program is expected to provide 25% more jobs in the postwar period than were available before the war when the company employed 12,000 workers.

Seeks Agency in Greece

Pan. Chr. Sophianopoulos, Rue Aristidou 4, Athens, Greece, an importer whose organization was founded in 1892, is interested in hearing from American manufacturers who are seeking representation in Greece. He is particularly interested in rubber chemicals and compounding ingredients, colors, etc., as well as synthetic rubber and latex, and would like to secure catalogs, samples, prices, and similar information.

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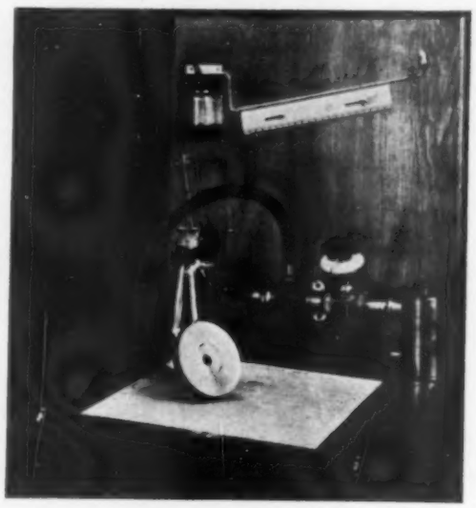
NEW EQUIPMENT

U.S. Rubber Rugosimeter

A new instrument for measuring the rugosity, or surface roughness, of calendered rubber sheet or similar samples, has been developed by the General Laboratories of the U. S. Rubber Co., Passaic, N. J. The property actually measured is the resistance to air flow between the rough surface and a plane test surface



resting on it. The apparatus is described in detail in the August, 1945, issue of the *Analytical Edition* of *Industrial & Engineering Chemistry*.

As will be noted in the accompanying illustration, the Rugosimeter consists essentially of a constant pressure air valve, a large needle valve with a calibrated scale, a manometer, and an annular test plate which rests upon the surface under test. In preparing calendered samples for rugosity measurements, determined by a theoretical formula, the nip is set at 0.025 inch as measured with lead or solder slugs at the sides of the roll while the stock is passing through. After one-half turn on the calender rolls, the sheet is taken off and laid on a talced table to cool and shrink. The rugosity usually varies appreciably over a given sample, and a reliable average requires measurements at five or more different points on each calendered stock. Since calendered sheets at room temperature often show some tendency to buckle or curl, the test plate must be weighted or hand pressure applied in some cases during the testing operation.

Although the calendered sheet is the best form of sample for the rugosity test, other forms can be measured if necessary. In one series of tests, tread slabs were measured with a test surface consisting of a flat ring of soft rubber 0.1 inch thick backed by soft cellular rubber 1 inch thick, which in turn was cemented to a steel plate. Sufficient pressure was applied during a measurement to cause the flexible rubber surface to follow the general shape of the curved slab surface. Extruded rods and strips have also been tested. Such samples, when bent to form a closed circle, or doughnut, can be tested between a pair of parallel plates. As

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a general rule, the total length of extruded stock in the sample tested should not be more than 6 or 8 inches.

In operation, the needle valve of the Rugosimeter is opened to the point at which the pressure on the manometer is one half the pressure maintained by the constant-pressure valve. The resistance of the needle valve to the air flow is then equal to and measures the resistance of the test plate on the sample. By a theoretical formula, this air-flow resistance is converted to a "rugosity height," which is the height of the hills above the valleys in an idealized rough surface of sinusoidal profile.

Bimetal-Element Dial Thermometer

A new bimetallic dial thermometer manufactured by Equipoise Controls, 342 Madison Ave., New York 17, N. Y., features a precision bimetallic helical coil measuring element, said to be permanently calibrated, highly accurate and extremely responsive. The instrument has a case of alloy steel, available in most sizes, an 18-8 stainless steel connection nut and stem, and a metal dial with large, easy-reading numerals and temperature graduations, and it can be furnished with an unbreakable glass crystal.

Expansion of the bimetallic coil rotates an attached small shaft and indicating pointer as one unit over the entire scale range. This is the only moving part, as there are no pivots, mechanical linkages, or gears. Rugged construction is said to protect the thermometer against corrosion, vibration, shock and rough handling.

Various standard ranges are available between limits of —90° F. and 1000° F. Test or laboratory thermometers are graduated to both C. and F. on the same scale. Temperature can be increased 50% or more beyond the end of the scale range without damage to the thermometer for ranges up to 500° F. and 10% for ranges up to 1000° F. Thermometers are obtainable in dial sizes of 2, 3 and 6 inches.

The instrument is easily installed by connecting the standard ½-inch connection nut directly into the point of service or into a separable socket or other type of mounting accessory.

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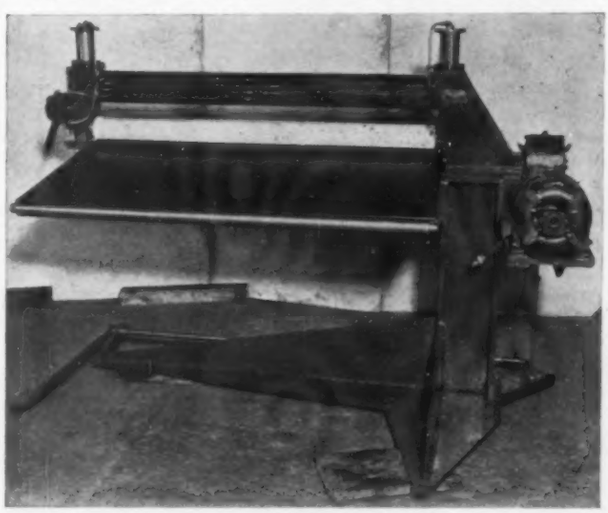

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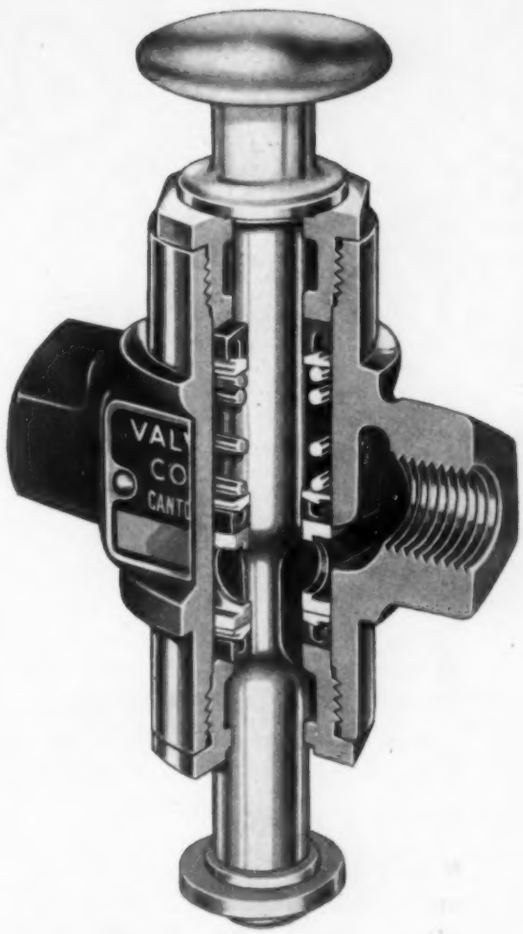

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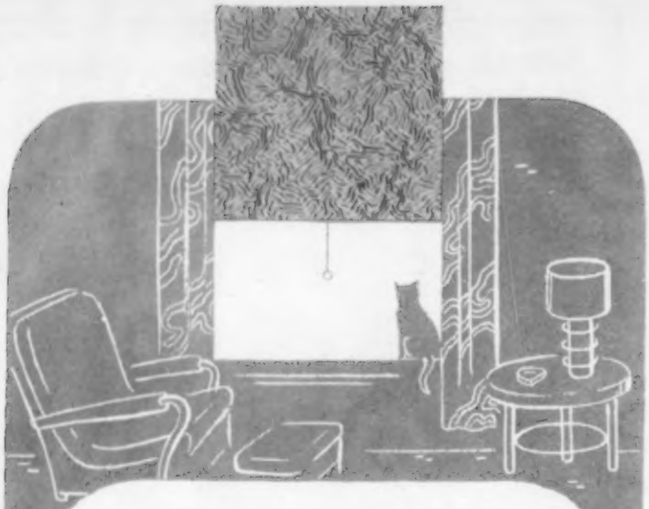

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New Precision Aging Bath

A new aging bath has been developed by the Precision Scientific Co., Chicago 47, Ill., for use in estimating the comparative ability of rubber and other elastomeric compositions to withstand the effect of immersion in oils and liquids and to secure comparative

data on which to base judgment as to their service quality, as covered by A.S.T.M. Specifications D-471 and D-735.

The capacity of the bath is 24 test tubes, 38 mm. diameter x 200 or 300 mm. long. The test tubes are supported in an adjustable rack made of stainless steel and resting directly in the bath, which can be readily removed when desired. The top shelf of the rack guides the condenser in a vertical position.

To provide uniform and constant temperature, the bath is heated by steel-sheathed immersion heaters controlled by an adjustable hydraulic thermostat. Circulation is provided by a ball-bearing, fully-enclosed, resilient-mounted motor stirrer. The temperature range of the bath is 35° to 200° C., with an accuracy of plus or minus 1° C.

The interior of the bath is made of stainless steel, while the exterior is of galvannealed iron finished in high temperature aluminum. Three inches of glass wool insulation is provided on sides and bottom. Overall dimensions of the bath, including the rack which supports the test tubes, are: 49 inches high, 24 inches wide, and 24 inches deep. The oil capacity is 19 gallons. A support stand with upper and lower shelves, which is 24 inches in height, is available. The bath operates on 115 volts, 60 cycles, a.c., 3000 watts.

The **Davis Remote Head Gas Alarm**, an instrument which indicates the presence of combustible gases and vapors and which visually and audibly indicates their approach to the dangerous limits before a fire or an explosion occurs, has been made available by the Davis Emergency Equipment Co., Newark 4, N. J.

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Coal-tar softener, formerly widely used in natural rubber, now found to be an effective plasticizer and wetting agent for GR-S to improve resistance to abrasion, tensile strength, elongation and resilience.

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Effective softener for several of the synthetic rubbers, such as Hycar OR, Perbunan, etc., imparting high tensile, low modulus and low set.

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Several types manufactured for both digestor and pan processes.

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Benzol, Tollac* Solvent, Nevsol*, Xylol, 2-SO-W* Hi Flash Solvent, Cosol*, and special solvents; for rubber cements and various rubber solutions.

*Reg. U. S. Pat Off.

R-9

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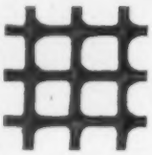
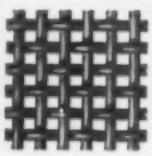
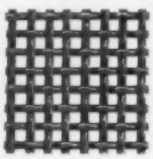
and Screens for Rubber Strainers, sifters, filters and similar process equipments.

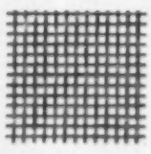


We have been specialists for many years in the making of precision wire cloths, wire screens and woven wire products.

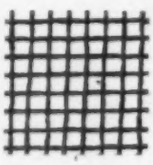


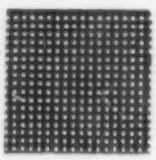
We apply our same precision principles in fabricating wire cloths into finished industrial units, for production or processing equipments or for permanent parts of countless industrial products.



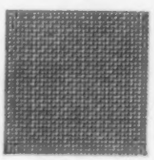


We invite your inquiries for wire cloths of all commercial metals or alloys or weaves, in continuous lengths or cut to size, or processed to meet your individual requirements.





We will follow your specifications and blue-prints exactly as your production engineers have prepared them—or we will submit suggestions for your approval.



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Nickel	Stranded	Galvanizing	Ribbons
Any special alloys available in rod or wire form	Sta-Tru	Painting	Rolls
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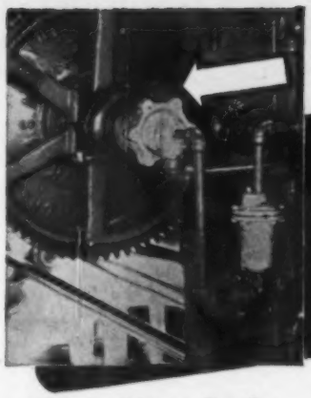
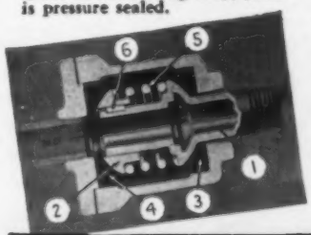


Have you considered JOHNSON JOINTS?

• Johnson Joint on Dry Can; gets steam in, condensate out.

• Nipple (1), fastened to rotating machine part. Sliding collar (2), keyed (6) to nipple. Carbon graphite seal ring (3) and bearing ring (4) eliminate oiling and packing. Spring (5) is for initial seating only; joint is pressure sealed.



The Johnson Rotary Pressure Joint is far more than just a packless stuffing box. It represents an entirely new method of admitting steam or liquids under pressure into rotating rolls or drums.

So many applications have been found for the Johnson Joint—from cold strip steel mills to machine tools—it may well hold the answer to one of your problems. Its packless, self-oiling, self-adjusting, and self-aligning design insures highest efficiency, and practically eliminates maintenance.

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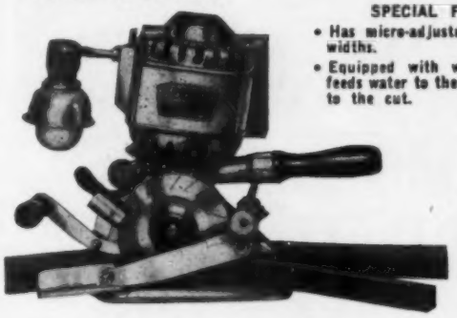
A PORTABLE machine capable of stripping slab rubber up to 1″ thick at the rate of 20,000 feet in 8 hours. Any width desired.



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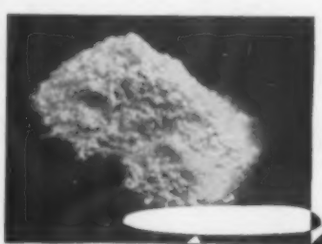

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REVIEWS

BOOKLETS, CATALOGS, Etc.

The Effect of Varying Quantities of Ethylene Glycol on the Properties of GR-S Stocks Containing Silene EF. (Report No. 45-1). Columbia Chemical Division, Pittsburgh Plate Glass Co., Grant Building, Pittsburgh, Penna. 8½ x 11 in. 18 pp.

As indicated by the title, this bulletin covers laboratory studies designed to determine the effect of varying quantities of ethylene glycol on the properties of GR-S stocks containing Silene EF. Eight compounds were studied with 30 volumes of Silene EF and an equal number with 40 volumes. Physical results are given in each case. The data indicates that by the addition of ethylene glycol to the compound, the rate of cure is speeded, the hysteresis heat built up is markedly lower, and the general "snappiness" of the stock is improved, the optimum glycol content appearing to be about 6% on the Silene EF. In studying the effect of ethylene glycol, use was made of the Goodrich Flexometer method of measuring hysteresis heat rise under rapidly vibrating stress.

•

South American Leaf Blight of Hevea Rubber Trees. (Technical Bulletin No. 882). By H. M. Langford. Issued by U. S. Department of Agriculture, Washington, D. C. 6 x 9¼ in. 32 pp. Available from U.S. Government Printing Office, Washington 25, D. C. at 10c a copy.

This bulletin reports the results of a four-year study of the influence of environmental factors on leaf blight severity made in connection with the cooperative rubber-planting program carried on by the United States and the Latin-American countries. After a brief description of the blight-control program which has been inaugurated, the bulletin discusses factors influencing disease development and severity and sets forth a system of classifying Hevea clones for resistance. There is also a discussion of other leaf spots associated with leaf blight, a report on resistance tests carried out at Turrialba, Costa Rica, and a discussion of clones recommended for field plantings. A bibliography is included for convenience.

•

What the Foreman Needs for Success. National Foremen's Institute, Inc., Deep River, Conn. 4 x 6¾ in. 16 pp. 25c.

The premise of this manual is the idea that the foreman's work is mainly with human beings, not machinery, and that the ability to handle personalities can be acquired. Three procedures are put forward as essential to acquiring this ability—adjusting one's own personality, learning to know one's workers, and learning to lead properly. These procedures are discussed briefly and are followed by a list of 15 questions which constitute a self-check for the foreman. A feature of the manual is a set of instructions on induction and orientation which the foreman is advised to apply in handling new employees.

•

Corrosion-Resistant Materials and Equipment. (Bulletin H.) U. S. Stoneware Co., Tallmadge Circle, Akron, Ohio. 8½ x 11 in. 16 pp.

The wide range of corrosion-resistant materials made by the company, including those made of natural and synthetic rubber, plastics and ceramics, is described in this bulletin. Tygon tubing, gasketing and paint are also illustrated and described, as is some of the chemical stoneware and masonry featured by the company. A table giving some of the physical properties of various Tygon compounds is included.

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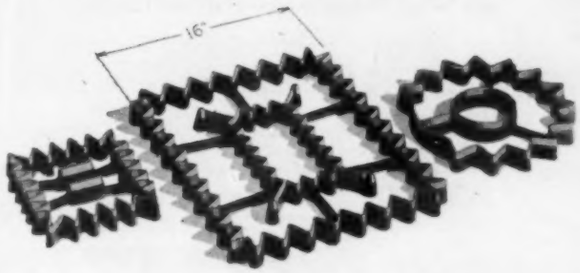

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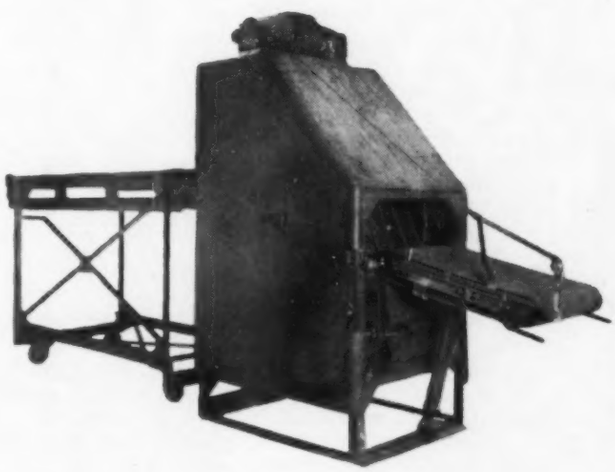

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REVIEWS (CONT'D)

Postwar Labor Policy. Bureau of National Affairs, 24th & N Sts. N. W., Washington, D. C. 8 x 10¾ in. 48 pp.

Reflecting the opinion of business, labor unions and the legal profession on the mediation of postwar labor disputes, this survey sets forth the attitudes of some 600 informed persons on such questions as whether post-war machinery for mediating labor disputes will be necessary or helpful, how such machinery should be established, what alternatives there are, etc. Numerous sample answers to these questions are quoted, the answers being grouped according to the professional classification of the person replying, as lawyer, large employer, CIO union member, association member, etc. Tables showing the percentage of affirmative and negative answers to each of the eight questions, also broken-down according to professional classifications, are included, as well as an appendix containing a reproduction of a sample questionnaire.

•

Neoprene Industrial Rolls. (Report No. 45-1). By L. S. Bake. Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Delaware. 6¼ x 9½ in. 20 pp.

Fundamental factors pertaining to the building of neoprene rolls are covered in this technical report, which lists properties inherent in the recommended compounds rather than attempting to describe all of the many types and requirements of rolls used in various industries. Although emphasis is placed on the harder types of roll compounds containing calcium silicate, recommendations for stocks in the soft range are also listed. Compounds shown include neoprene non-black and light colored rolls.

•

The Ross Laboratory. J. O. Ross Engineering Corp., 350 Madison Ave., New York 17, N. Y. 8½ by 11 in. 4 pp.

This illustrated brochure describes the company's renovated testing and development laboratory at New Brunswick, N. J. Equipment illustrated includes a batch oven, a tray oven with dehumidification equipment, a test unit for radiant gas burners, direct and indirect fired heaters, a low pressure steam boiler, a refrigeration unit for air cooling, and a conveyor oven.

•

Rex Flat Spray Nozzles. (Bulletin No. 459). Chain Belt Co., Milwaukee, Wis. 8½ x 11 in. 8 pp.

This folder describes the company's line of flat spray nozzles, which are made for use in industries where water is employed in cleaning, cooling and washing operations. Besides illustrating and describing the nozzle, uses, the folder gives tabular information concerning their discharge in gallons per minute, their dimensions, and a list of materials, sizes and prices.

•

How to Train Your Assistants. By Richard W. Wetherill. Published by the National Foremen's Institute, Inc., Deep River, Conn. 4 x 6¾ in. 20 pp. 25c.

This manual offers executives, supervisors and foremen a tested method of training their assistants by the application of a simple formula of five steps which has been used extensively in business and industry. Briefly and concisely, the manual tells exactly what the formula is, how it is used, why it works and when to apply it.

•

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REVIEWS (CONT'D)

Music-At-Work. Executone, Inc., 415 Lexington Ave., New York 17, N. Y. 9 x 6 in. 14 pp.

The aim of this booklet is to give the busy executive an understanding of the complete history of the use of music in plants and factories. It traces the story of music at work from earliest times to the planned programs of today, touching on early experiments in this field by Edison and others, the use of music in English factories during the blitz, and the growing acceptance of industrial music in America. Recent government and college research into results obtained from the playing of planned music in plants and factories is also discussed.

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Farrel-Birmingham Equipment News. Farrel-Birmingham Co., Inc., Ansonia, Conn. 8½ x 11 in. 8 pp.

The latest edition of this house organ describes some of the plastics processing machinery featured by the company in both laboratory and production sizes, including Banbury mixers, Gordon plasticators, plastics mills, plastics calenders, and molding presses. Each piece of equipment is attractively illustrated. The bulletin also describes the facilities of the company's process testing laboratory, the use of which is offered to those engaged in rubber and plastics manufacture.

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Statex 93 in GR-I Inner Tubes. (Bulletin No. 133). Binney & Smith Co., 41 East 42nd St., New York 17, N. Y. 8½ x 11 in. 3 pp.

As indicated by the title, data on the use of Statex 93 in inner tubes made of GR-I (Butyl) is given in this bulletin. Through the cooperation of one of the inner tube manufacturers, the data reported is based on factory mixed, extruded and cured inner tubes. Two compounds are shown, in one of which Statex 93 replaces in an equal amount a blend of EPC and SRF blacks. Physical results on both compounds are given.

•

Rolling on Rayon. Industrial Rayon Corp., Cleveland 1, Ohio. 5 x 7 in. 16 pp.

The story of rayon's use in tires is interestingly told in this illustrated booklet. Sketches are freely used to explain the basic difference between rayon and natural fibers, and illustrations and text are used to tell how rayon is made and to describe in greater detail special methods of spinning, twisting, twist-setting, coning and weaving which are used in the production of the company's yarn cord and fabric.

EMULSIONS

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NEW YORK RUBBER CEMENT CO., INC.
(ESTABLISHED 1895)

SYNTHETIC RUBBER CEMENTS CORPORATION

3660 BOONE AVENUE
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COLITE CONCENTRATE

A HIGH QUALITY CONCENTRATED LIQUID MOLD AND MANDREL LUBRICANT—*NON-TOXIC, NON-TACKY, ODORLESS.*

- *Simplifies the removal of cured rubber from the molds.*
- *Results in a transparent satin-like finish.*
- *Does not build up on the molds.*
- *Extremely concentrated and low in cost.*

A Direct Source for Zinc and other Metallic Stearates.

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SAME OBJECTIVE

...different results

Grinding methods of years gone by, especially the one used by cave men, were crude. But, they served the purpose at that time.

Today, grinding done by Whittaker, has become an exact science. It is more than merely pulverizing raw materials for rubber to a specified maximum micron size. As an instance, it involves a comprehensive study of the crystalline structure of various grades of the same mineral. This results in a better understanding of the characteristic properties and how they will be affected by grinding.

As a benefit of this research at Whittaker, you get the proper grade of rubber ingredients, ground to the proper maximum micron size, which will aid in bettering the over-all quality of your rubber products.

Talc • Stearates • Heavy Magnesium Oxide • Pumice Stone • Whiting Extra Light Calcined Magnesium • Sericite • Magnesium Carbonate Pyrophyllite

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WHITTAKER EST. 1890

Whittaker, Clark & Daniels, INC.

260 West B'way, New York 13, N. Y. • Plant: South Kearney, New Jersey

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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, SEPT. 11, 1945

Crude Rubber

THE collapse of the Japanese and the ultimate surrender of all occupied areas means the early return of natural rubber in volume. How soon this volume will reach mass proportion is still a question mark, although Dutch authorities have indicated that volume shipments may be expected within three months. It is quite likely that initial shipments in volume will come from the Netherlands East Indies, since the natives in Java, Sumatra and Borneo have been tapping trees regularly throughout the occupation, and are in the best position to increase tapping activities. Labor on the plantations in Malaya was largely recruited from India and other centers and there may be some delay in reorganizing tapping activities.

Initial investigations of rubber-producing areas in the Far East indicate that large quantities of baled rubber ready for immediate shipment are on hand. The fact that such quantities are located in various major ports is undoubtedly due to the effective blockade maintained in the past year or so by the Allied fleets and air forces. According to reliable reports, stockpiles of 350,000 tons in the Netherlands East Indies, 50,000 to 200,000 tons in Malaya, 150,000 tons in French Indo-China, and 50,000 tons in Thailand, have been located.

These same investigations have indicated that as a general rule the rubber plantations throughout the Far East are in fairly good condition, and all the dire reports of the past few years have been far too pessimistic. The jungle has not reclaimed the plantations, the trees have not been diseased, plantation equipment has not been destroyed. Based on the early reports it seems evident that more than 800,000 tons of natural rubber can be expected from the Far East in 1946.

Prices shown below are ceilings set by the Office of Rubber Reserve, Reconstruction Finance Corporation:

	C	N-C
Plantations—		
Ribbed Smoked Sheets, 1X	22½	40
Thick Pale Latex Crepe, 1X	22½	40
Thin Pale Latex Crepe, 1X	22½	40
Thick Brown Crepe, 1X	21⅜	38⅞
Thin Brown Crepe, 1X	21⅜	38⅞
Thick Remilled Blankets, #1	21⅜	38⅞
Rolled Brown or Flat Bark	18	35⅛
Smoked Blankets, #1	21⅛	38⅜
Claro Brand 1XRSS	22½	40
Sole Crepe Trimmings	22	39½
Sole Crepe	22½	40
Wild—		
Uncut Fines, Crude	15	29
Cut Fines, Crude	15½	29¾
Cut Fines, Washed & Dried	22½	40
Upriver Coarse, Crude	12⅝	26⅛
Upriver Coarse, Washed & Dried	20¼	37¾
Caucho Ball, Crude	11⅝	24¾
Caucho Ball, Washed & Dried	19½	37
Guayule—		
Carload Lots	17½	31
Less than Carload Lots	18	31½
Balata—		
Surinam Sheet	42½	42½
Manaos Block	38¼	38⅝
Colombian Block	38¼	38⅝
Peruvian Prime	38⅝	38¼
Chicken Wire	23¼	23¼
Latex—		
Normal, Tank Car Lots	26	43½
Creamed, Tank Car Lots	26¾	44¼
Centrifuged, Tank Car Lots	27¼	45¼
Heat-Concentrated, Carload Drums	29½	47

C for Civilian Use; N-C for Non-Civilian Use.

Scrap Rubber

The end of global warfare has thus far had little effect on the scrap rubber trade. Quotations in general are still steady and demand for tires and tubes, tire parts, and peelings is strong enough to keep values where they have been in recent months. Under the terms of Amendment 13 to R.P.S. 87, the scrap rubber order, ceiling prices for rubber peelings from recapped or retreaded scrap tires have been reduced 15 per cent, bringing them to the level of prices generally paid for such peelings. At the same time, the ceilings for peelings, as well as for S.A.G. scrap, have been relisted according to the sales groups recently established by WPB. There are now three groups of peelings—natural, synthetic, and recap or retread, and two groups of S.A.G. scrap—natural and synthetic. Prices shown below are ceilings on typical grades of scrap:

(Prices to Consumers, Delivered Akron)

Mixed passenger tires	ton	$20.00
Beadless truck tires	ton	26.00
Mixed truck tires	ton	20.00
Beadless passenger tires	ton	26.00
No. 1 passenger peelings	ton	52.25
No. 1 truck peelings	ton	52.25
No. 2 passenger tubes	lb.	.07¾
Red passenger tubes	lb.	.07½
Black passenger tubes	lb.	.06¾
Mixed passenger tubes	lb.	.06½
No. 2 truck tubes	lb.	.07½
Red truck tubes	lb.	.07¼
Black truck tubes	lb.	.06½
Buffings	ton	35.00
Bicycle tires	ton	15.00
Air bags and water bags	ton	15.00
Boots and shoes	ton	33.00

Tire Fabrics

The situation in the tire fabric field remains unchanged, with practically no demand for such fabrics. Consequently, prices are nominal and in many quarters are not even being quoted. The prices shown below are those which were in force on or about January 15, 1942.

(Prices Net at the Mill)

Peeler, carded, 23/5/3	lb.	.43½ @	.44
Peeler, carded, 23/4/3	lb.	.44½ @	.45
Peeler, carded, 15/3/3	lb.	.41½ @	.42
Peeler, carded, 15/4/2	lb.	.41½ @	.42
Peeler, carded, 13/3/3	lb.	.40½ @	.41
CHAFERS			
Carded, American, 1 1/16"	lb.	.43½ @	.44
Carded, American, 1"	lb.	.39½ @	.48

Sheetings

48x40	36	in.	5.50	lb.	—	@ 8.272
40x40	36	in.	6.15	lb.	—	@ 7.398
40x36	36	in.	6.50	lb.	—	@ 7.000
48x48	40	in.	2.50	lb.	—	@17.200
48x48	40	in.	2.85	lb.	—	@15.087
56x60	40	in.	3.60	lb.	—	@12.638
48x44	40	in.	3.75	lb.	—	@11.733

Note: Prices shown above are ceiling prices set by order of the O.P.A.

Cotton

The price of middling uplands on the Cotton Exchange has swung in the range of 54 points since our last report (August 9), high for the period being 23.34 on September 6 and low 22.80 on August 21. The average price of middling uplands on the Exchange for the month of August was 23.10, based on 25 trading days. Prices in mid-August continued the downward trend exhibited in the early part of the month and the price dropped below 23 cents on August 20 for the first time since last April. The announcement on August 14 that the Japanese had accepted Allied peace terms had only a minor effect on the market. Although large scale cancellations of military contracts were inevitable as a result of the surrender, civilian demands for cotton textile goods will more than offset the cutbacks. The trade is of the opinion that the distribution and consumption of cotton will continue at near wartime peaks until the civilian demand is fully met, which may be a matter of two or three years. Uncertainty as to the government's future policy on cotton was also a contributory factor to declining prices. The market has shown increasing signs of strength in the past 10 days or so, especially since President Truman's message to Congress in which he recommended enactment of additional measures to carry out price support commitments on agricultural commodities. There is talk, too, of the possible failure of the cotton crop to meet actual requirements. Quotations for middling uplands on the Exchange follow:

	Aug. 9	Sept. 11		
	Close	High	Low	Close
December	22.88	22.86	22.80	22.83
March	22.85	22.81	22.72	22.79
May	....	22.75	22.66	22.72

Reclaimed Rubber

Demand for reclaim continues at the same high level of recent months, with no slackening on the horizon due to the end of global warfare. Most reclaimers are still trying to increase production substantially, but manpower remains a problem. Some demand is already reported from the export field, and such demand is expected to increase steadily for the next several months. Although domestic demand stems from practically every branch of the industry, the resumption of passenger tire manufacture on a large scale to meet the tremendous civilian needs has naturally resulted in increased demand for reclaim from the tire field.

Shoe				
Unwashed	lb.	.07½ @	.07¾	
Tube				
Black Tube	lb.	.11¾ @	.12	
Red Tube	lb.	.12½ @	.12¾	
Tires				
Black (acid process)	lb.	.03 @	.08¼	
Black, selected tires	lb.	.07 @	.07¼	
Truck, Heavy Gravity	lb.	.09 @	.09¼	
Miscellaneous				
Mechanical blends	lb.	.05 @	.06	
White	lb.	.13½ @	.13¾	

Ducks

Enameling (single filling)	lb.	— @	.44¼
Belting and Hose	lb.	— @	.39
Single filling, A grade	lb.	— @	.19¾
Double filling, A grade	lb.	— @	.20¾

"Peace Hath Her Victories No Less Renowned Than War"

(JOHN MILTON)

AMERICA'S giant rubber industry turns thankfully, hopefully to PEACE... secure in the knowledge that its vital war tasks have been well performed.

Now Buffalo—*since 1883, serving the industry solely as reclaimers*—looks to the peace-time use of its high quality reclaim by hundreds of manufacturers of finished rubber products. Vital as Buffalo Reclaim was to the materiel of war... it will be no less essential in thousands of different articles in which reclaim's special virtues and economies have long been recognized.

Printed below are two partial lists of products in which reclaim, in war and peace, plays an important role. Buffalo lists them as a reminder of the versatility of its products and invites all manufacturers of rubber articles to submit inquiries relative to any application of reclaim.

LIFE RAFTS—LIFE VESTS
AIRPLANE PARTS—GUN MOUNTS
MILITARY TIRES—FUEL CELLS
ARMY & NAVY COMBAT SOLES
ARCTICS, HEELS and SHOE PACS
PROTECTIVE CLOTHING
FIRE HOSE—CAMELBACK
PONTONS—PRESSURE TAPE
SURGICAL SUPPLIES—GASKETS

PASSENGER CAR, TRUCK & BUS TIRES
TRACTOR TIRES—INNER TUBES
BABY CAB AND TOY TIRES
RUNNING BOARDS and AUTO MATS
BATTERY BOXES—INSULATED WIRE
RUBBER SHOES, HEELS and SOLES
RAINCOATS—HOT WATER BOTTLES
MECHANICAL GOODS—GARDEN HOSE
INDUSTRIAL & FAN BELTS, JAR RINGS, ETC.

U. S. RUBBER RECLAIMING COMPANY, INC.

500 FIFTH AVENUE • NEW YORK 18, N. Y. • (Plant at Buffalo, N. Y.)

TRENTON . . . H. M. ROYAL, Inc., 689 Pennington Avenue • TORONTO . . . H. VAN DER LINDE, Ltd., 156 Yonge Street

63 Years Serving the Industry Solely as Reclaimers

CHEMICAL MARKETS

New York, Sept. 11, 1945
All Prices F.O.B. Works

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.28	.33
A-10	lb.	.36	.42
A-19	lb.	.52	.58
A-32	lb.	.60	.70
A-77	lb.	.42	.55
A-100	lb.	.42	.55
Aldehyde ammonia, crystals	lb.	.65	.70
Altax	lb.	.39	.41
Beutene	lb.	.59	.64
B-J-F	lb.	.34	.39
Butasan	lb.	—	1.10
Butyl Zimate	lb.	—	1.10
Captax	lb.	.34	.36
Crylene	lb.	.40	.47
Di-Ortho-Tolyguanidine	lb.	.44	.46
Diphenylguanidine	lb.	.35	.41
El-Sixty	lb.	.36	.43
Ethasan	lb.	—	1.10
Ethyl Tuads	lb.	—	1.25
Ethyl Zimate	lb.	—	1.10
Ethylidine aniline	lb.	.42	.43
Formaldehyde aniline	lb.	.31	—
Guantal	lb.	.39	.48
Heptoen	lb.	.34	.39
Hexamethylenetetramine	lb.	.33	—
Lead Oleate, No. 999	lb.	.13	—
Witco	lb.	.15	—
Ledate	lb.	—	1.20
Methasan	lb.	—	1.20
Methyl Tuads	lb.	—	1.25
Methyl Zimate	lb.	—	1.20
Monex	lb.	—	1.25
Pentex	lb.	.74	.84
Phenex	lb.	.49	.54
Pip-Pip	lb.	—	1.63
R & H 50-D	lb.	.42	.43
R-2 Crystals	lb.	—	1.55
Rotax	lb.	.44	.46
Safex	lb.	1.15	1.25
Santocure	lb.	.60	.67
Selenac	lb.	—	1.60
SPDX-G	lb.	.53	.58
Super-Sulfur No. 2	lb.	.13	.15
Thiocarbamilid, drums	lb.	.28	.33
Thiofide	lb.	.39	.46
Thiotax	lb.	.34	.41
Thiurad	lb.	—	1.25
Trimene	lb.	.54	.64
base	lb.	1.03	1.18
Triphenylguanidine	lb.	.45	—
Ulto	lb.	.99	1.04
Ureka	lb.	.50	.57
Blend B	lb.	.50	.57
Blend C	lb.	.48	.55
Vulcanex	lb.	.42	.43
Vulcanol	lb.	.85	—
Inorganic			
Litharge, domestic	lb.	.07	.07½
Magnesia, calcined, heavy	lb.	.04	—

COLORS

Blues [b]			
Prussian	lb.	.36	—
Ultramarine	lb.	.17	.27
Browns [b]			
Mapico	lb.	.1135	—
Umber, Turkey	lb.	.04¼	—
Greens [b]			
Chrome	lb.	.23	—
Guignet's Green	lb.	.70	—
Reds			
Antimony crimson, 15/17	lb.	—	—
Indian	lb.	.08¼	—
Domestic (Maroon)	lb.	.11	—
Mapico	lb.	.096	—
Red oxide, pure	lb.	.10	.12
Rub-Er-Red	lb.	.09¼	—
Whites [b]			
Cryptone No. 19	lb.	.0560	.0585
Cryptone CB No. 21	lb.	.0560	.0585
Cryptone ZS-800	lb.	.0825	.0850
Lithopone:			
Albalith	lb.	.04¼	.04½
Astrolith	lb.	.04¼	.04½
Azolith	lb.	.04¼	.04½
Ray-cal	lb.	.05½	.05¾
Rayox	lb.	.14½	.15¼
Titanox A	lb.	.14½	.14¾
Titanox B	lb.	.05¾	.06
Titanox C	lb.	.05½	.05¾
Zinc Oxide—American Process [b]			
American Azo:			
ZZZ (lead free)	lb.	.07½	.07½
Anaconda, lead free	lb.	.07¼	.07½
Horsehead Lead Free Brand:			
Special—3	lb.	.07¼	.07½
XX Red—4	lb.	.07¼	.07½
Kadox, black label—15	lb.	.07¼	.07½
Red label—17	lb.	.07¼	.07½
72	lb.	.07¼	.07½
St. Joe, black label	lb.	.07¼	.07½
green label	lb.	.07¼	.07½
red label	lb.	.07¼	.07½
U. S. P.—7, bbls.	lb.	.10½	.10¾
Zinc Oxide—French Process: [b]			
Florence White Seal—7 bbl.	lb.	.09½	.09¾
Green seal—8	lb.	.09	.09¾
Red seal—9	lb.	.08½	.08¾
Yellows [b]			
Cadmolith	lb.	.55	.60
Chrome	lb.	—	.50
Mapico	lb.	.071	—

[a] Price Ceilings.
[b] Price Suggestions or Agreements.

BLACKS
(In bags, carload lots)

Arrow Compact	.0355	—
Atlantic	.0355	—
Certified	.0355	—
Certified Spheron	.0355	—
Continental	.0355	—
Disperso	.0355	—
Dixiedensed	.0355	—
Dixiedensed 66	.0355	—
Excello	.0355	—
Furnex	.03½	.06
Furnex Beads	.03½	.06
Gastex	.03½	.06
Kosmobile	.0355	—
Kosmobile 66	.0355	—
Kosmos-Dixie 20	.03½	.06
Micronex (Amarillo)	.0355	—
Micronex Beads (Amarillo)	.0355	—
Pelletex	.03½	.06
P-33	.04	.06½
Philblack A	.05	—
Shell Carbon (Del. Midwest)	.0240	—
Sterling	.035	—
Supreme	.0355	—
Thermax	.0225	.05
Wyex	.0355	—

COMPOUNDING MATERIALS

Aluminum Flake	ton	18.00	24.50
99½%-300	ton	—	16.50
86-90%-300	ton	—	13.50
Asbestine	ton	16.50	20.00
Atomite	ton	—	27.50
Barium carbonate (98-100%)	ton	47.00	49.00
Barytes	ton	25.35	36.00
Bentonite	ton	11.00	16.00
Blanc fixe, dry	ton	60.00	67.00
Calcene	ton	37.50	43.00
Catalpo (fact)	lb.	.02	—
Clay, Aerfloted, Suprex	ton	11.00	23.50
Aerfloted Paragon	ton	10.00	22.50
Champion	ton	—	11.00
Crown	ton	—	11.00
Dixie	ton	11.00	23.50
Kaolloid	ton	—	9.00
Langford	ton	—	8.50
Magnolia	ton	—	10.00
McNamee	ton	10.00	22.50
Par	ton	—	11.00
Witco	ton	10.00	—
Kalite No. 1	ton	26.00	52.00
Kalvan	ton	100.00	126.00
Keystone white	ton	—	14.00
Magnesium carbonate	lb.	.06¼	—
Mineralite	ton	—	30.00
Pyrax A	ton	—	8.10
Rottenstone (powd. Dom.)	ton	25.50	37.50
Rubberol	lb.	—	.17½
Silene EF (calcium silicate)	lb.	.055	.06
Silical	ton	65.00	85.00
Snowflake white	ton	—	16.00
Tale, domestic	ton	14.50	—
Whiting, commercial	ton	16.00	26.00
Witco	ton	—	6.50
Witcarb R	ton	—	100.00
Witcarb R-12	ton	—	40.00
Wood Flour (100 mesh)	ton	30.00	32.00

MINERAL RUBBER

285°-300° Mineral Rubber	ton	25.00	27.00
Black Diamond	ton	25.00	—
Dielex	lb.	—	.06
Hard Hydrocarbon	ton	25.00	27.00
MilliMar	lb.	—	.05½

MISCELLANEOUS

Aromatics—Rodo #0	lb.	4.00	4.50
Rodo #10	lb.	5.00	5.50
Curodex 19	lb.	2.75	—
Curodex 188	lb.	3.50	—
Curodex 198	lb.	4.50	—
Para-Dora	lb.	4.50	—
Areaklene No. 375	lb.	.35	.50
Darvan (dispersing agent)	lb.	.30	.39
Santomerse S	lb.	.11	.25
Sponge Paste	lb.	—	.18
Sunproof	lb.	.22¾	.27¼
Tonox	lb.	.50	.59
Ty-Ply	gal.	6.75	8.75
Unicel (blowing agent)	lb.	.50	—

SOFTENERS

Acids			
Acetic, 28%, bbls. [a]	100 lb.	3.38	3.63
Nitric, 36 degrees	cwt.	5.00	—
Acids, Fatty			
Laurex	lb.	.14¼	.17¼
SL-20	lb.	.11	.13
Stearex Beads	lb.	.10	.11
Stearite	lb.	.10	—
Alkalies			
Caustic Soda, 76%	cwt.	2.70	5.70
Soda Ash, 58%	cwt.	1.15	2.98
Oils			
Degras, bbls. [a]	lb.	.10	.12
Para-Flux	gal.	.17	.18
Para-Lube	lb.	.046	.048
Petrolatum, amber	lb.	.03¼	—
Pigmentaroil, tank cars	gal.	.20½	—
in drums	gal.	.26½	.27½
Pine, tanks [a]	gal.	.55	—
Rosin Oil, empd.	gal.	.40	—
Rubberol	lb.	.13½	.14
Rubtack	lb.	.18	—
Seedine, c.l.	lb.	.07¼	—
Witco Palm Oil	lb.	—	—
Witco Softener No. 20	gal.	.20	—
Woburn No. 8, c.l.	lb.	.06	—
Resins and Pitches			
Pitch, Burgundy	lb.	.08	—
coal tar	ton	19.00	22.00
hardwood	ton	16.00	22.50
pine, 200 lb. gr. wt.	bbl.	—	4.50
Pigmentar, tank cars	gal.	.20½	—
in drums	gal.	.26½	.27½
Retort Pine Tar, drums	gal.	.26½	.27½
Solvents			
Acetone, pure [a]	lb.	.07	—
Benzene, 90%, tank car	gal.	.14	—
Beta-Trichlorethane	gal.	—	.20
Bondogen	lb.	.98	1.25
Carbon, bisulfide	lb.	05	.08¼
Carbon tetrachloride	gal.	.73	1.27
Dichlorethylene	lb.	—	—
Dipentene, cml., drums	gal.	.48	.50
Ethylene dichloride	lb.	.07½	.08¼
Plastogen	lb.	.07¾	.12
Reogen (drums)	lb.	.11½	.15
Rub-Sol	gal.	.09½	—
Trichlorethylene	lb.	.08	.09¼
Turpentine, steam dist., drums	gal.	.80	.83
Waxes			
Antisol	lb.	.22½	.23½
Beeswax, white [a]	lb.	.58	—
Carnauba, yellow [a]	lb.	.83¼	—
Ceresin, white, dom.	lb.	.13½	.15
Montan, dom.	lb.	.30	.35
Paraffin [a]			
Yellow crude scale, 124/126	lb.	.04¼	—
Refined, 120/122	lb.	.05¼	—

ANTI-OXIDANTS

Agerite Alba	lb.	1.95	2.03
Gel	lb.	.52	.54
Hipar	lb.	.61	.63
Powder	lb.	.40	.42
Resin	lb.	.43	.45
Resin D	lb.	.40	.42
White	lb.	1.23	1.33
Albasan	lb.	.69	.74
Antox	lb.	.54	.56
B-L-E	lb.	.40	.49
Flectol H	lb.	.40	.47
Neozone A, C, D, E	lb.	.40	.63
Oxynone	lb.	.77	.90
Retardex	lb.	.44½	.47½
Santoflex B	lb.	.40	.47
Santoflex BX	lb.	.54	.61
Santovar O	lb.	1.15	1.40
S.C.R.	lb.	.32	.34
Stabilite	lb.	.48	.50
Stabilite Alba	lb.	.69	.74
VGB	lb.	.43	.52

EXTENDERS

Naftolen R-100	lb.	.10	.12

LUBRICANTS—MOLD & RUBBER SURFACE

Areaklene	lb.	.35	.50
Cocoa Soapstock	lb.	.06	.08
Colite	gal.	.90	1.15
Dipex	lb.	.06	.08
Glycerized Liquid Lubricant	gal.	—	1.35
Lubrex	lb.	.25	.30
Mineralite	ton	—	30.00
Sericite	ton	65.00	75.00
Soap Tree Bark, cut, sifted	lb.	.06	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.25	—
Amberex Type B	lb.	.18¼	—
Black	lb.	.08½	.13
White	lb.	.09	.15
Brown	lb.	.10	.14
Neophax A	lb.	.16½	—

VULCANIZING INGREDIENTS

Dispersed Sulfur No. 3	lb.	.08	.12
Sulfur Chloride, yellow (drs.)	lb.	.03	.08½
Sulfur, rubber makers			
Refined (bags)	cwt.	2.55	—
Commercial (bags)	cwt.	2.20	—
Telloy	lb.	1.75	—
Vandex	lb.	1.75	—
Vultac No. 1	lb.	.38	.43
Vultac No. 2	lb.	.38	.43
Vultac No. 3	lb.	.42	.49

WANT ADS

RATES: Eight cents per word, minimum charge $3.00, except POSITIONS WANTED, $1.00 for 40 words or less, extra five cents per word. All classified advertisements payable in advance. Address replies to box numbers care of RUBBER AGE, 250 West 57th St., New York 19, N. Y.

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RUBBER CHEMIST: Eight years' experience in compounding rubber, synthetic rubbers, and thermoplastic resins for wire and cable for extrusion, molding and calendering operations. Will also consider the mechanical goods and adhesive fields associated with these materials. Address Box 1775, RUBBER AGE.

MAN with wide experience in rubber products manufacture qualified for position of Factory Manager or General Superintendent. Successful experience with production and technical problems as well as in labor relations. Address Box 1809, RUBBER AGE.

RUBBER CHEMIST: Twelve years' experience in large and small companies. Thoroughly skilled in compounding, development, and production of mechanical goods in natural rubber, reclaims, and synthetics. Excellent background in management. Desires permanent position as Chief Chemist with small mechanical goods concern interested in developing strong, well-balanced technical organization. Address Box 1811, RUBBER AGE.

RUBBER-PLASTICS CHEMIST with fourteen years of practical experience in compounding of hard rubber mechanical goods; in rubber equipment, such as mills, mixers, calenders, coaters, Banbury for mixing of rubber, synthetics and plastics; pressure sensitive adhesives; thermosetting and thermoplastic resin for impregnating, laminating, and injection molding. Wishes position of responsibility in laboratory or plant. Address Box 1814, RUBBER AGE.

RUBBER CHEMIST, 31, prefers position as Chief Chemist in New England. Experienced in drug sundry items, sponge, soles, heels, tapes and proofed goods. Has thorough background in natural, synthetic rubbers and vinyl resins, laboratory development, factory compounding, control, and equipment. Excellent references. Address Box 1824, RUBBER AGE.

SALES MANAGER assignment desired by executive with twenty-three years' experience in organization and supervision, and possessing exceptionally large acquaintance among officials, purchasing, sales, production, and development personnel among country's rubber companies. Would also consider acting as agent to promote quality products of interest to rubber manufacturers. College graduate. Excellent health. Forty-four. Address Box 1827, RUBBER AGE.

RUBBER SALESMAN, experienced, aggressive, with large following among jobbers, department stores, chain stores, and industrials, interested in obtaining these lines: Baby pants, bathing caps, shower curtains, gloves, aprons, footwear. Eastern territory. Correspondence invited. Address Box 1830, RUBBER AGE.

RUBBER CHEMIST: M.S. 1932. Experienced in physical and chemical analysis of rubber compounds, correction of defective batches, research and development on natural and synthetic rubber. Familiar with all laboratory work and compounding. Has supervised laboratory. Desires laboratory and factory position. Address Box 1841, RUBBER AGE.

CHEMICAL ENGINEER, Ph.D. Twenty years' experience in rubber research direction, and five years of broad experience in management. Address Box 1843, RUBBER AGE.

TIRE CONSTRUCTION DEVELOPMENT ENGINEER, ten years with large company manufacturing passenger, white sidewall, implement, tractor, racing and truck pneumatics and having complete charge of airplane tires during war years, desires position of greater responsibility and salary with smaller concern. Address Box 1845, RUBBER AGE.

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RUBBER CHEMIST, 16 years' experience with large and small companies in mechanicals, proofing, tires and latex and raw material evaluation; interested in technical sales or factory compounding. Address Box 1757, RUBBER AGE.

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ADHESIVE CHEMIST: Graduate Chemist, experienced in the formulation of solvent synthetic and natural rubber cements for the shoe trade. Reliable New England concern offers a permanent position. Address Box 1821, RUBBER AGE.

SHIFT FOREMEN for Rubber Dispersion and Reclaim Rubber operations. Plant located in East. Send resume to Box 1837, RUBBER AGE.

CHEMIST for Rubber Laboratory with synthetic rubber compounding experience. Midwest area. Excellent postwar opportunity. Address Box 1808, RUBBER AGE.

CHEMIST who has had experience in compounding synthetic rubbers for molded and wrapped goods, including rubber covered rolls. Address Box 1816, RUBBER AGE.

GENERAL SUPERINTENDENT for Eastern plant employing approximately 800 people. Must be fully experienced and familiar with all phases of plant management. Excellent salary and opportunity for advancement. In reply give full details as to qualifications and background. Address Box 1817, RUBBER AGE.

ADHESIVE CHEMIST, FLOCKING ADHESIVES. Excellent opportunity with high quality New England concern for a graduate Chemist familiar with vulcanizing types of natural and synthetic rubber latex adhesives and solvent cements. Permanent position. Address Box 1822, RUBBER AGE.

WANTED—EXPERIENCED DEVELOPMENT ENGINEER for Cord Sets and Electrical Harnesses. Permanent opportunity for a young man with engineering ability and initiative. Research and development. State age, training, and experience. Location, Connecticut. Address Box 1826, RUBBER AGE.

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EXECUTIVE FACTORY SUPERINTENDENT for a long established, moderate size Wire and Cable Plant. Good living conditions and excellent opportunity for the right man. Plant located within one hour of New York City. Must be thoroughly capable of assuming full charge of factory, including rubber and plastic compounding and have a thorough knowledge of products and factory procedure. If you are looking for a permanent peacetime opportunity and have the necessary experience, write full particulars, enclosing photograph. All correspondence held in strict confidence. Address Box 1832, RUBBER AGE.

TECHNICAL SERVICE LABORATORY of well established Chemical Company and supplier of rubber compounding ingredients has openings for following personnel:
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2. Rubber mill and pressman.
3. Rubber testing personnel.

Location New York. Please send complete personal data, photograph, and state salary expected. Address Box 1834, RUBBER AGE.

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RUBBER CHEMIST: Research and development. Experience in rubber compounding including synthetics.

ADHESIVE CHEMIST: Research and development. Experience in the use and preparation of adhesives of the water dispersion type and cut-back type.

CHEMIST—AUTOMOTIVE PRODUCTS: Knowledge of sound dampening, adhesives, saturated felts desirable. Must be capable of supervising group of Automotive Products Chemists.

Send resume to Box 1835, RUBBER AGE.

ADHESIVE CHEMIST, PRESSURE-SENSITIVE. We are interested in contacting a graduate chemist with a thorough knowledge of the types of adhesives used in the pressure-sensitive field. It will be a permanent position with a well established New England manufacturer of adhesives. Address Box 1823, RUBBER AGE.

PROGRESSIVE NEW JERSEY RUBBER MANUFACTURER of shoe products is interested in obtaining the services of a graduate chemist or chemical engineer for evaluation of new materials, and processes. Previous compounding and processing development experience desirable, but not essential. Salary commensurate with technical background and experience. Address Box 1839, RUBBER AGE.

RUBBER CHEMIST, experienced in compounding Mechanical Rubber Goods and factory production methods for Eastern manufacturer of high grade Mechanical Rubber Goods located in New Jersey. In reply state all qualifications, past experience, and salary desired. Address Box 1842, RUBBER AGE.

WANT ADS

(Continued)

HELP WANTED (Continued)

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SUPERINTENDENT for modern Rubber Plant employing 150 to 200 people. Must be familiar with production methods, milling, tubing, braiding, lead covering, vulcanizing and molding. State age, education, experience, present earnings and salary expected. Address Box 1848, RUBBER AGE.

SALESMAN or young man willing to be trained for chemicals to rubber manufacturing trade in Central West. Headquarters Chicago. Address Box 1849, RUBBER AGE.

LATEX CHEMIST: Graduate Chemist, experienced in the development of synthetic and natural rubber latex adhesives for the shoe trade. Position permanent. Concern well established house of specialists in the adhesives field. Location, New England. Address Box 1820, RUBBER AGE.

TECHNICAL SUPERINTENDENT for Reclaim Rubber Plant located in East. Send resume to Box 1836, RUBBER AGE.

CHEMIST OR CHEMICAL ENGINEER, experienced in compounding of synthetic rubber latices, reclaimed dispersions, synthetic rubbers and plastics, for coating adhesive dipped goods and allied fields. Laboratory in New York City. Address Box 1852, RUBBER AGE.

RUBBER CHEMISTS: Specialists in various fields to work on fee basis. Important research organization requires outside assistance. State qualifications, specialty, background, and references. Address Box 1782, RUBBER AGE.

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WANTED—30" x 60" Used or New Low or High Pressure Hydraulic Presses, Single 7½" Daylite Opening 15" Diameter Ram, Immediate Delivery Required: Also, Various Sizes Multiple Opening High Pressure Hydraulic Presses. Address Box 1819, RUBBER AGE.

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FOR SALE: 16" x 42" Mixing Mill. Address Box 1815, RUBBER AGE.

FOR SALE: One Black Rock Manufacturing Company Rubber Roller and Tube Grinder Machine size 4LM, in excellent condition. Address Box 1818, RUBBER AGE.

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FOR SALE: Hydraulic Presses: 600 ton Watson-Stillman double acting downward 16" dia. ram, 21" stroke, 24" x 24" platen; 3—12" x 12", 7½" dia. rams; 1—26" x 45", 10" ram; 1—44" dia. 300 ton, 12" dia. ram with pump; 1—14" x 14", 5" ram; 3—20" x 20", 10" rams; 1—24" x 24", 6" ram; 1—15" x 15", 8" ram; 1—20" x 20" 200 tons, with pushbacks; 1 Carver Laboratory 6" x 6" Unit. Pumps: 1 Robertson Triplex 5 GPM, 5000 lbs.; 1 National Triplex 1" x 3", 4000 lbs., V Belt pulley; 1 HPM Triplex 1⅓ GPM, 2500 lbs.; 1—4 Plunger 4½ GPM, 2000 lbs.; 1—HPM 2 stage 1.05 GPM, 2500 lbs., 4.13 GPM 900 lbs.; 1 HPM Triplex 1¾ GPM 2000 lbs. on high, 16 GPM 400 lbs. on low, V Belt Drive; 1 Hele Shaw JLP 12, 44 GPM, 1200 lbs. with new control; 2 Vickers Units, 27 GPM 1000 lbs. Accumulators: Tank type, high and low 3½ GPS 4000 lbs. and 20 GPS 500 lbs.; Weighted type ¾ GPS 2500 lbs. with weights. Extruders: 2—No. 1 Royle Perfected with cone pulleys. Refiner: Birmingham 13" x 18" x 24". Mill: Top Cap. 15" x 36". Advise your requirements. Highest prices paid for your Used Equipment. UNIVERSAL HYDRAULIC MACHINERY COMPANY, 285 Hudson Street, New York 13, N. Y.

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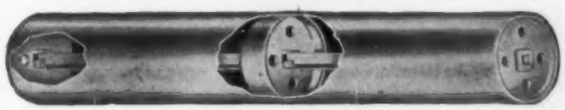

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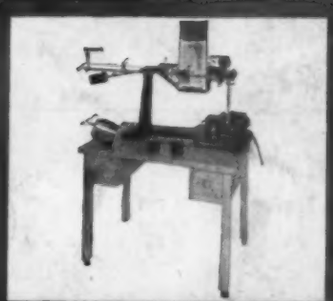

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